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Skeptical Inquirer

THE MAGAZINE FOR SCIENCE AND REASON

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THE BIZARRE QUNIVERSE OF QANON CONSPIRACIES

Stephanie Kemmerer

Science: Truth's Gold Standard
Richard Dawkins

Behe, Bias, and Bears (Oh My!)
Nathan Lents

Philosophical Magisterium?
Charles H. Jones & Massimo Pigliucci

A Psychic Detective Tragedy
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Skeptical Inquirer March/April 2021 | Volume 45 No. 2

FEATURES

32
Life, the Quniverse, and Everything, Part 1

QAnon is the ultimate conspiracy—the mothership; the "Choose-Your-Own Adventure" saucerful of codes and secrets. Some ex-followers help our investigator examine its dangers and delusions.

STEPHANIE KEMMERER

38
Science: The Gold Standard of Truth

Wanton attacks on scientific truths and even the existence of truth itself are profoundly troubling. Science's history is a spectacular cascade of truths.

RICHARD DAWKINS

41
Behe, Bias, and Bears (Oh My!)

Another swing and a miss for intelligent design creationism.

NATHAN H. LENTS

47
Is There a Philosophical Magisterium?

Some scholars are promoting the idea that philosophy studies questions that science cannot. An analysis of the scientific method finds otherwise.

CHARLES H. JONES

51
Continuity, Not Magisterium—A Response to Jones

Science and philosophy exist on a continuum with areas of overlap and reciprocal aid. Each informs the other—or should.

MASSIMO PIGLIUCCI

54
Psychic Detectives and the Tragedy of Harley Dilly

An Ohio boy's disappearance from a small town around Christmas 2019 was a genuine mystery. It eventually garnered the attention of national news media—and psychics.

BENJAMIN RADFORD

COLUMNS

FROM THE EDITOR
Fear for Our Future—or Hope? 4

NEWS AND COMMENT
Nashville Christmas Bomber an Aliens-and-Lizard-People Conspiracy Theorist / NAS Report on 'Havana Syndrome' Mired in Controversy / Like Crop Circles, Mysterious Monoliths Appear—and Disappear / Physics Professor, *Voodoo Science* Author Robert L. Park: An Appreciation / The Blakeslee Files: A Science-Writing Family's Treasure Trove / CFI Libraries Redesigns Website 5

INVESTIGATIVE FILES
Incredible Vanishings and the Case of Ambrose Bierce
JOE NICKELL 14

REALITY IS THE BEST MEDICINE
Hypnosis Revisited
HARRIET HALL 17

BEHAVIOR & BELIEF
The Tragedy of Our Commons
STUART VYSE 20

SKEPTICAL INQUIREE
The Pointlessness of Pet Acupuncture
BENJAMIN RADFORD 25

NEW AND NOTABLE BOOKS 62

LETTERS TO THE EDITOR 63

COMMENTARY

Facts, Theories, and Best Explanations
PETER J. MARSTON 27

REMEMBRANCE

The Many Valuable Contributions of Scott O. Lilienfeld, Scientist, Skeptic, and Colleague
D. ALAN BENSLEY 29

REVIEW

Fresh Thinking or Exploitation?
JANYCE L. BOYNTON 60

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[FROM THE EDITOR

Fear for Our Future—or Hope?

When podcaster/journalist Stephanie Kemmerer proposed our cover article on QAnon, I knew little about the phenomenon except for occasional mentions. Once she researched, reported, and submitted it (she interviewed former QAnon followers, and her article by then had expanded to a two-part series), I read the result, "Life, the Quniverse, and Everything," in disturbed amazement. "Red-pilled," "black-pilling," "Q Drops," "Q crumbs," "8chan," QAnon aggregator sites—a whole new vocabulary of modern unreality. This loose assemblage of the world's most virulent conspiracy theories is a creation of our own times, an ill society. Yet in another way, it is as old as human nature. She notes that QAnon draws upon ancient hateful tropes and anti-Semitic themes going back past the origins of Nazi fascism, the Blood Libel Myth, and the tactic of declaring one's enemies Satanists. What's especially scary is, she points out, followers consider themselves heroes—and victims.

And, as we saw in horror on January 6, many QAnon followers were among the hordes who violently invaded the Capitol of the United States to try to stop the Constitutional certification of the duly elected next president. But QAnon is just one of many hate groups fueled by conspiratorial thinking and irrational beliefs, and we needn't elevate it to any mythic status over all others. The extreme elements among them have now shown they pose a threat to democracy and civilized society.

Everything we scientific skeptics at the Skeptical Inquirer and elsewhere have studied and warned about for decades—irrationality, delusions, detachment from reality, magical thinking, wishful thinking, misinformation and disinformation, the inability (or unwillingness) to distinguish facts from myth, the strong denial of validated knowledge, the creation and spreading of wild conspiracy theories—have been on painful public display for all of us to witness.

Carl Sagan warned us about this a quarter century ago. In a 1994 CSICOP keynote address and January/February 1995 Skeptical Inquirer cover article, he expressed a "foreboding" he had for a future time when "our critical faculties in steep decline, unable to distinguish between what's true and what feels good, we slide, almost without noticing, into superstition and darkness."

But he was ultimately an optimist (his title was "Wonder and Skepticism"), and we all have to have hope—hope that the wiser leaders of both parties can find ways to heal our wounds and restore calm and civility. The successful January 20 inauguration, the new president's healing words and appeals to facts and truth—and the same from three past presidents (from both parties)—are all cause for optimism. In the meantime, science goes on. Scientific discoveries going back years brought the record-quick creation and testing of three vaccines against COVID-19 that may soon bring an end to that scourge. Science is one place where we can always find human progress. We celebrate its achievements and truth-finding processes. (Richard Dawkins's fine essay in this issue enlarges on that theme.)

We scientific skeptics share in that scientific spirit. At the same time, we apply scientific thinking, critical thinking, and skeptical inquiry to the whole arena of wayward ideas and popular claims deserving well-informed skeptical scrutiny. This issue of Skeptical Inquirer is filled with relevant examples.

—Kendrick Frazier

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Nashville Christmas Bomber an Aliens-and-Lizard-People Conspiracy Theorist

Benjamin Radford

On Christmas morning 2020 in downtown Nashville, Tennessee, a bomb inside a motor home detonated. Minutes earlier, the RV had been emitting a voice warning passersby to get away, because it would soon explode. When it did, Anthony Warner was inside and was killed instantly.

Police recovered a vehicle identification number from the debris and soon realized that the suspect was also the victim—that it was a suicide bombing. Public concerns and rumors to the contrary, authorities found no evidence that the incident or Warner were linked to terrorism, but the question of motive remained. Warner, age sixty-three, was an unmarried semi-recluse who worked as an information technology specialist.

There is nothing unusual about a man trying to take his own life; worldwide there are an estimated 10 to 20 million attempted suicides each year. About 30,000 people die by suicide each year in America; up until recently, it was the ninth leading cause of death in this country, and the suicide rate is higher than the homicide rate.

Public suicides have often been used as a medium for social protest. Frustrated political and social activists often see self-immolation as a powerful tool to bring international attention to their plight. In the early 1960s, Buddhist monks in Vietnam famously set themselves on fire in political protest. Though rarer, the practice continues today; in 2018, prominent gay rights lawyer David Buckel set himself on fire in a Brooklyn park, hoping the media attention from his grisly suicide would draw attention to climate change.

According to Jordan Frieman of CBS News, several days before the bombing Warner sent packages to several acquaintances. They contained many typed pages and thumb drives containing conspiracy-related videos. "The knowledge I have gained is immeasurable. I now understand everything, and I mean everything from who/what we really are, to what the known universe really is." Warner also opined that "everything is an illusion" and "there is no such thing as death."

Warner embraced many wild conspiracy theories, asserting for example that extraterrestrials had been attacking Earth since September 2011, a month that "was supposed to be the end game for the planet." The attacks were somehow thwarted but had continued; this is not widely known because, Warner asserted, the U.S. government and news media had conspired for years to cover up the attacks. As to why they would do that, his answer was simple: the world is run by a secret cabal of Reptilians, a race of lizard people. Drawing from a hodgepodge of pop culture sources ranging from the satirical sci-fi thriller *They Live* to conspiracy promoters Alex

Jones and David Icke, Warner wrote that "They put a switch into the human brain so they could walk among us and appear human." From 9/11 "Truther" conspiracies to moon landing hoaxes, Warner seems to have embraced a wide variety of bogus and discredited claims. The letter was signed with the name Julio, an alias Warner often used; he is believed to have had a dog by that name that may have also been killed in the blast.

Early speculation was that the bombing was tied to some terrorism plot or grievance against AT&T, the office building nearest the explosion, possibly linked to debunked 5G conspiracy claims. Investigation is ongoing, but as of early January, it seems likely that Warner wanted to publicize his conspiracy beliefs. He was well aware that his Christmas morning bomb would draw attention (a neighbor recalled Warner saying ominously that "Nashville and the world is never going to forget me") and that the conspiracy-riddled manifestos he sent to people on December 23 would come to light.

Recognizing the media paradox of trying to report on Warner's beliefs while not giving them undue attention, some news outlets decided to merely summarize Warner's materials. Tennessee's NewsChannel 5, for example, noted its "decision not to publish them in their entirety. We are attempting to balance shedding light on his mindset prior to the bombing with not giving him unnecessary notoriety."

Warner is of course not the first conspiracy theorist to use a bomb to draw attention to his beliefs. In May 2002, six people were injured when eighteen pipe bombs left in mailboxes exploded in Iowa, Illinois, Nebraska, Colorado, and Texas. Luke Helder, a twenty-one-year-old college student from Minnesota, was arrested for the bombings, which he described as "attention getters." Helder combined virulent anti-government beliefs with rambling philosophical rants. In a six-page typed letter to a student newspaper at the University of Wisconsin-Madison, Helder discussed his belief in various conspiracy and paranormal topics. A friend of his was quoted by ABC News as saying that Helder "seemed really obsessed about New Age religion and death and the fact that death really doesn't mean an end to existence."

Helder, eerily echoed by Warner, wrote that each person can create his or her own reality, and that "once you begin to realize the potential you have as a consciousness/soul/spirit, you will begin to harness the abilities you have to produce realities. Because you are producing the reality entirely, you are not confined to the laws of physics." Helder was explicit about the purpose of his serial bombings: he wanted to enlighten the world to his beliefs and revealed truths. "I'm doing this because I care … In the end you will know I was telling you the truth anyway. I'm taking very drastic measures in attempt to provide this information to you."

Belief in conspiracy theories cannot be said to have directly caused either Warner's or Helder's attacks, though their belief systems surely played a role in these tragedies. Jared Loughner, the gunman who killed six people and injured fourteen others including Rep. Gabrielle Giffords in a 2011 Tucson shooting, also advocated conspiracy theories, as did Aaron Alexis, a government contractor who killed a dozen people and injured eight others at the Washington Navy Yard in September 2013; he told police that he had been harassed through a government mind control program.

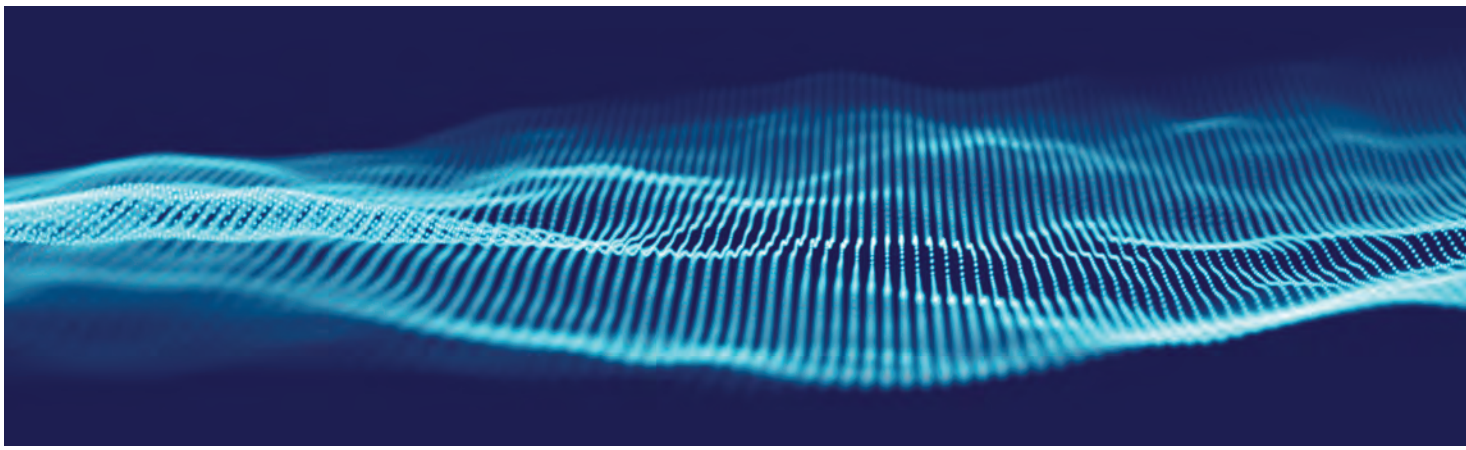
Extreme acts of violence can seem to be a logical reaction to conspiracy beliefs. If one sincerely believes, for example, that a cabal of high-ranking Democrats are Satanic baby-eating pedophiles (see Stephanie Kemmerer's article on QAnon in this issue)—then resorting to violence may seem reasonable and appropriate. This is especially true when conspiracy theories appeal to political extremists who already harbor a distrust of the government and a willingness to take up arms.

Of course, most violent people are not conspiracy theorists, most mentally ill people are not violent, and most conspiracy believers are not violent. Though conspiracy beliefs do not cause violence, they can give a name and form to generalized rage and helplessness and set the stage for violent actions.

Benjamin Radford is the deputy editor of the Skeptical Inquirer.

NAS Report on 'Havana Syndrome' Mired in Controversy

Robert Bartholomew



History is the arbiter of controversy.
—Lord Acton

The prestigious National Academy of Sciences (NAS) has released its findings into what sickened dozens of American Embassy diplomats in Cuba starting in late 2016 (dubbed "Havana Syndrome"). The panel reached no definitive conclusion but found that pulsed radiofrequency (RF) radiation, a.k.a. directed microwave energy, was the most likely cause. Committee members were hampered by a lack of information due to privacy concerns and government secrecy. They also could not rule out the possibility of mass psychogenic illness but considered it unlikely. They said they had difficulty assessing the psychological explanation because there was "no epidemiological evidence about patterns of social contacts" (National Academy of Sciences 2020).

This case has been steeped in controversy ever since the State Department first acknowledged the episode at a press briefing on August 9, 2017. A central problem has been a lack of transparency; to date, the U.S. government has denied Freedom of Information Act requests on the subject, and investigations by both the Centers for Disease Control and Prevention and the FBI have never been made public.

The NAS panel, which was commissioned by the State Department, wrote that pulsed radio frequency energy was the most likely cause, as it is consistent with "many of the distinctive and acute signs, symptoms, and observations reported by DOS employees." The committee observed that "The acute initial, sudden-onset, distinctive, and unusual symptoms and signs are difficult to ascribe to psychological and social factors" (National Academy of Sciences 2020, 2). Most of the affected diplomats reported hearing strange sounds before feeling unwell. None of the incidents took place at the American Embassy but instead at one of two major Havana hotels, diplomat homes, and an apartment complex.

In gravitating toward the RF explanation, the panel found the literature on the "Frey effect" compelling. It was first described by American biophysicist Allen Frey in 1961 when he observed that pulsed microwave beams directed at a person's head could produce clicking sounds. The NAS report states that "If a Frey-like effect can be induced on central nervous system tissue responsible for space and motion information processing, it likely would induce similarly idiosyncratic responses … [including] alterations in brain functioning" (National Academy of Sciences 2020, 19–20).

University of Pennsylvania bioengineer Kenneth Foster views any link between the Frey effect and Havana Syndrome as nonsensical.

There are several problems with the microwave explanation.

University of Pennsylvania bioengineer Kenneth Foster views any link between the Frey effect and Havana Syndrome as nonsensical. "It is just a totally incredible explanation for what happened to these diplomats. … It's just not possible. The idea that someone could beam huge amounts of microwave energy at people and not have it be obvious defies credibility. There's nothing behind it. You might as well say little green men from Mars were throwing darts of energy," he said (Hurley 2019, 44).

The mysterious sounds that preceded the "attacks" were remarkably var-

ied. Some said they were high pitched; others described them as low pitched. The report made no mention that in over a dozen instances where diplomats recorded the incidents each was later identified as the sound of insects—most notably crickets and cicadas (Baloh and Bartholomew 2020, 13–15). Even the time between hearing the sounds and feeling symptoms varied dramatically. For instance, in January 2018, State Department Medical Director Dr. Charles Rosenfarb told the Senate Foreign Relations Committee that the symptoms occurred "within minutes to hours of the event" (Senate Foreign Relations Committee 2018).

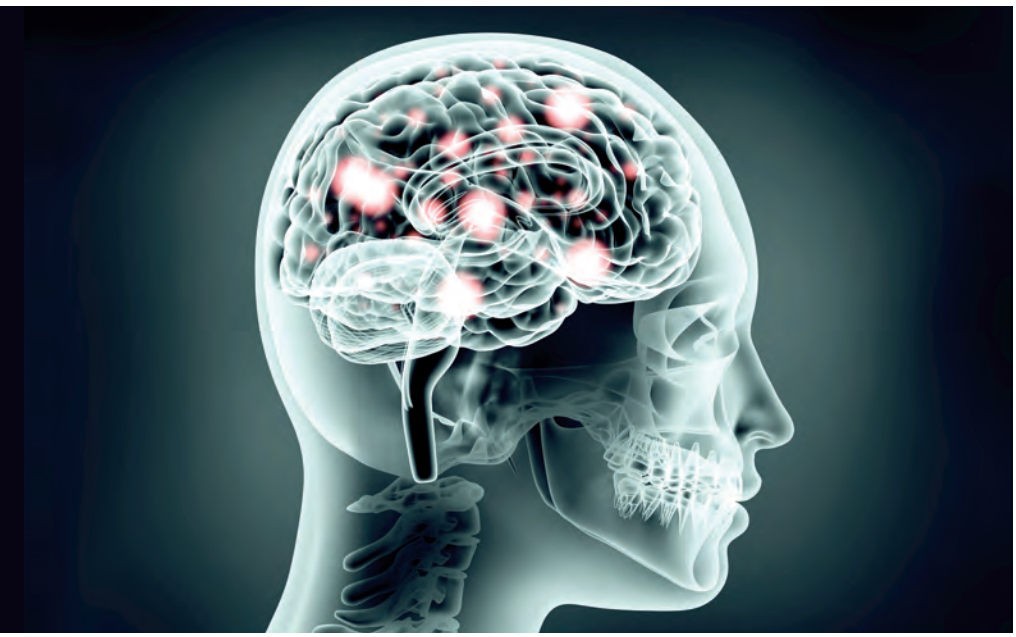
Another issue involves the array of symptoms that were reported, including headache; ear pain and pressure; fatigue; nausea; dizziness; memory problems; confusion; disorientation; trouble walking, sleeping, and focusing their eyes; sensitivity to sound; tinnitus; pain; difficulty concentrating; pressure; hearing loss; and concussion-like symptoms. Most of these complaints are reported every day in doctors' offices, while concussion-like symptoms have been associated with long-term stress (Baloh and Bartholomew 2020, 59–70). In one study of affected diplomats that was leaked to the media, it was reported that about a third of the subjects had suffered hearing loss. However, when the study was published and the hearing tests were conducted, just two people were determined to have experienced diminished hearing—both of whom had pre-existing hearing loss prior to going to Cuba. The patients *thought* they had suffered hearing damage, but tests proved otherwise (Hoffer et al. 2019; Baloh and Bartholomew 2020, 31).

The Omission of Pivotal Evidence

The panel's assertion that they could not adequately assess the psychogenic hypothesis due to a lack of data is perplexing. No less than three separate reports highlighting the social patterning of the outbreak were absent from the study. Two lengthy articles detailing this patterning were published by investigative journalists Tim Golden and Sebastian Rotella (Golden and Rotella 2018; Golden and Rotella 2019). A third study—the only book to be published to date on Havana Syndrome—also described how the outbreaks spread through the diplomatic community (Baloh and Bartholomew 2020). The State Department was aware as early as December 2019 that the book was about to be published and that it was focused on a psychogenic explanation.

Another curious twist took place soon after the panel was formed. Professor Simon Wessely of the Department of Psychological Medicine at Kings College in London gave an interview in which he expressed the view that mass psychogenic illness was the most likely cause. Shortly thereafter, he was removed from the panel (Wessely 2020).

In light of these circumstances, it would not be unreasonable to ask whether political forces may have been at work in steering the publicly acceptable explanations. Time (and the anticipated release of Freedom of Information documents) will likely bring clarity.



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Robert Bartholomew is a sociologist and investigative writer who has studied mass hysteria, social panics, folkore, and the paranormal. He is also an Honorary Senior Lecturer in the Department of Psychological Medicine at Auckland University; his most recent book (with Robert Baloh) is *Havana Syndrome*.

Like Crop Circles, Mysterious Monoliths Appear—and Disappear

Benjamin Radford

In November 2020, state biologists surveying wild bighorn sheep by helicopter in San Juan County, Utah, noticed something odd in a remote sandstone canyon: a triangular metal pillar about ten feet tall.

They later visited the curiosity on foot and took photos, soon spawning international headlines and internet buzz. Comparisons to the obelisk in the science fiction classic *2001: A Space Odyssey* inevitably arose, along with suggestions (most surely satirical) that it was the work of aliens. Internet sleuths comparing archive satellite images discovered that it had been placed there some time in late 2016 and had not been noticed.

Ten days after it was first discovered—and after a stream of curiosity seekers made pilgrimages there—it was gone. Several men arrived under cover of darkness to dismantle and remove the piece, which was revealed to have been hollow and constructed of plywood. They later stated that it had been removed to protect the fragile local ecosystem from gawkers. The work was at first attributed by some to artist John McCracken (who died in 2011), though upon closer inspection doubts arose. As of this writing, the creator has not been definitively established, but whoever he/she/they are, they started quite a stir.

Within a month, dozens of these structures (colloquially referred to as "monoliths") appeared at different places around the world, seemingly every few days, including at Britain's Isle of Wight; Romania; San Luis Obispo, California; Pittsburgh, Pennsylvania; near the Joshua Tree National Park; Spain; Switzerland; Belgium; Paraguay; Germany; and other countries.

Though it may not be obvious at first glance, many parallels to the crop circle phenomenon are apparent. In both cases, you have anonymous artists creating public art. While there are countless

theories about the origin of crop circles, the only proven cause is humans. Just like the monolith installations, crop circles appear overnight—or at least when no one is watching—and like the monoliths, crop circles are a form of public art, like pieces by Banksy or another graffiti artist. And, of course, both were attributed to extraterrestrial intelligence.

There's a strong copycat effect as well. Soon after the first crop circles began appearing in the 1970s in the English countryside, they garnered much attention and publicity, which in turn spawned more people who said, "Hey, those are really cool. I'll bet some friends and I could do that"—and sure enough they could (and did). The skill involved in both types of art varies of course by the artist, but the basic forms of crop circles (circles and rectangles) aren't difficult to create (see "Legend of the Mowing Devil," SI, November/December 2020).

Several of these mystery monoliths (such as those in Pittsburgh) were later revealed to be part of a publicity or marketing stunt; this too has a precedence in crop circles. Several prominent crop circles were later revealed to have been commissioned for marketing campaigns, including a mysterious 310-foot-diameter design that appeared in California in 2013, created for computer graphics company Nvidia.

Just as it is a mistake to assume that all crop circles were created by the same person or team, the same is true of the monoliths. Indeed, several of the monolith makers were identified. In early December 2020, four artists and fabricators came forward and acknowledged that a stainless steel monolith that appeared atop California's Pine Mountain was their work, intended as "a piece of guerrilla art." It's likely that in the coming months more creators will come forward or be revealed.

Both crop circles and these mystery monoliths are intended to create delight, intrigue, controversy, and attention. And the basic reason for both is the same: Why does anyone create art? *L'art pour l'art.* Call the monoliths what you like: fad, hoax, stunt, copycat, prank, art. Perhaps their most important function was diversion for a public weary of pandemic deaths and political division.

Physics Professor, *Voodoo Science* Author Robert L. Park: An Appreciation

Kendrick Frazier

Credit: Carole Cuaresma - Wikipedia

Robert L. Park, American physicist and noted critic of pseudoscience (and fellow of the Committee for Skeptical Inquiry), died April 29, 2020, at the age of eighty-nine.

A Phi Beta Kappa graduate of the University of Texas, Park got his PhD in physics from Brown University. He spent most of a decade working as a member of technical staff and later director of the Surface Physics Division at Sandia National Laboratories in Albuquerque. In 1974, he took a faculty position at the University of Maryland Physics Department and was chairman from 1975 to 1978. He spent most of his career at the university.

In 1983, he also became director of public information for the Washington, D.C., office of the American Physical Society (APS), where he became involved with the intersection of science and public policy and all its hazards and foibles.

Park was best known and respected in scientific and skeptical circles for his well-informed and often pungent critiques of all manner of pseudoscience. His main forum for years was his popular "What's New" weekly email newsletter, initially issued via the APS and later by the University of Maryland. Recipients eagerly watched for it every Friday. It carried short items of timely scientific news and succinct critiques and pithily written personal comments on various pseudoscientific fads, claims, and beliefs.

In 2000, Oxford University Press published his *Voodoo Science: The Road from Foolishness to Fraud*, a book that a *New York Times* review said was a worthy successor to Martin Gardner's classic *Fads and Fallacies in the Name of Science*.

Voodoo Science received widespread acclaim and also generated some controversy. Biology professor Ursula Goodenough called Park a "national resource." Richard Dawkins, in a blurb, wrote, "I finished this brilliant book within a day, and then felt such withdrawal symptom I went right back to the beginning and started again." After reading it, he said, "you'll never again waste time or your money on astrologers, 'quantum healers', homeopaths, spoonbenders, perpetual motion merchants, or alien abduction fantasists."

Physicist N. David Mermin reviewed it in *Nature*, calling it "a fascinating compendium of tales of human folly" and said Park is "a superb storyteller." Yet he suggested that historians and philosophers of science would find its pronouncements about the nature of science "oversimplified and naïve." In *Science*, Kenneth R. Foster called Park "an articulate and skeptical voice of reason about science" and added, "His essays are delightful to read, and their critical views may be unfamiliar to many nonscientists."

I reviewed *Voodoo Science* in *Physics Today*, calling it a classic work that "has freshness and originality—and an importance and potential for influence—perhaps not seen since [Martin] Gardner's first." Matt Nisbet, in an online column on csicop.org on January 1, 2001, called it the best skeptic book of 2000. He also noted the irony that one of the few critical reviews came in Park's "hometown newspaper," the *Washington Post*, which thought its attacks on pseudoscience were "overzealous." The newspaper later published letters countering that criticism.

Voodoo Science was favorably reviewed in the Skeptical Inquirer by professor and educator Gerry Rising (July/August 2000), who wrote, "If only this book could be made required reading for those called upon to make decisions about science, our political leaders and our journalists in particular, how well we would be served." He enjoyed Park's outspokenness, which caused some concerns at the APS, and said he supported Park's "tongue-in-cheek" disclaimer attached to his weekly reports: "Opinions are the author's and are not necessarily shared by APS, but they should be."

Rising noted that Park invented the term *voodoo science* to encompass all four versions of bad and dubious science, each of which Park carefully defined: *pathological science*, *junk science*, *pseudoscience*, and *fraudulent science*.

The cover article of that same issue of Skeptical Inquirer was Park's own "Voodoo Science and the Belief Gene," adapted by Park from the book. It described a physicist's credulous embrace of transcendental meditation's claims that it could promote tranquility in Washington, D.C.; discussed at some length the burgeoning "great global warming debate," which Park said is as much about values as it is about science; talked about what science is; and mentioned "the noisy and unpleasant"

processes of science, which include the need to abandon beliefs in the face of new evidence. He wrote that "overall the system works amazingly well … the process transcends the failings of individual scientists." Then he returned to "the carbon dioxide war" and to transcendental meditation's ridiculous claims of levitation, noting that "pseudoscience is never open to scientific challenge."

The Skeptical Inquirer also published several excerpts over the years from some of Park's "What's New" columns, especially on such topics as unfounded fears about RF and EMF radiation (cell phones and the like).

Park's 2008 book *Superstition: Belief in the Age of Science* (Princeton University Press) didn't get the same attention; it had a slightly different emphasis. Clearly siding with the forces of reason in a world of seemingly increasing superstition, he wrote about scientists of faith, natural selection as the secret of life, prayer studies, searching for the soul and the afterlife, the New Age ("in which anything goes"), quantum mysticism, and the placebo effect, which gets confused with real medical effects. In the introduction, he wrote poignantly about his experience of getting crushed by a falling oak tree while jogging in Washington's Rock Creek Park, which nearly killed him. "I would not be telling this story had it not been for recent advances in medicine and technology."

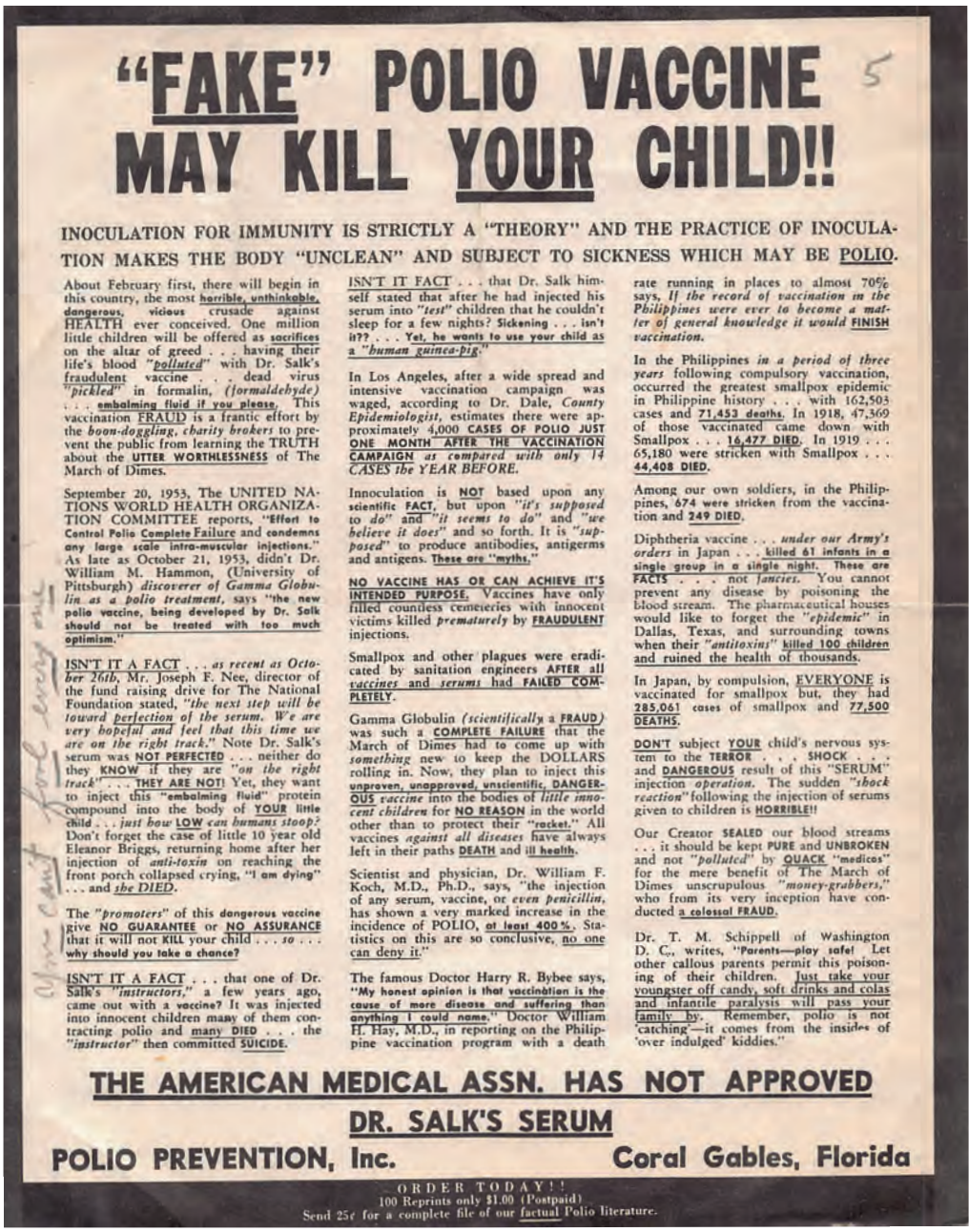
Robert Park's expertise as a physicist, his experience in Washington-based science and public policy, his clear and pungent writing style, and his courage in calling out nonsense head-on in succinct, topical items helped educate and inform a whole generation of scientists and scientific skeptics.

Park, a longtime Committee for Skeptical Inquiry fellow, has been added to CSI's Pantheon of Skeptics (see skepticalinquirer.org/pantheon-of-skeptics/).

Kendrick Frazier is a fellow of the Committee for Skeptical Inquiry and editor of the Skeptical Inquirer.

The Blakeslee Files: A Science-Writing Family's Treasure Trove

Sandra Blakeslee



"FAKE" POLIO VACCINE MAY KILL YOUR CHILD!!

INOCULATION FOR IMMUNITY IS STRICTLY A "THEORY" AND THE PRACTICE OF INOCULATION MAKES THE BODY "UNCLEAN" AND SUBJECT TO SICKNESS WHICH MAY BE POLIO.

About February first, there will begin in this country, the most horrible, unthinkable, dangerous, vicious crusade against HEALTH ever conceived. One million little children will be offered as sacrifices on the altar of greed . . . having their life's blood "polluted" with Dr. Salk's fraudulent vaccine . . . dead virus "pickled" in formalin, (formaldehyde) . . . embalming fluid if you please. This vaccination FRAUD is a frantic effort by the boon-doggling, charity brokers to prevent the public from learning the TRUTH about the UTTER WORTHLESSNESS of The March of Dimes.

September 20, 1953, The UNITED NATIONS WORLD HEALTH ORGANIZATION COMMITTEE reports, "Effort to Control Polio Complete Failure and condemns any large scale intra-muscular injections." As late as October 21, 1953, didn't Dr. William M. Hammon, (University of Pittsburgh) discoverer of Gamma Globulin as a polio treatment, says "the new polio vaccine, being developed by Dr. Salk should not be treated with too much optimism."

ISN'T IT A FACT . . . as recent as October 26th, Mr. Joseph F. Nee, director of the fund raising drive for The National Foundation stated, "the next step will be toward perfection of the serum. We are very hopeful and feel that this time we are on the right track." Note Dr. Salk's serum was NOT PERFECTED . . . neither do they KNOW if they are "on the right track" . . . THEY ARE NOT! Yet, they want to inject this "embalming fluid" protein compound into the body of YOUR little child . . . just how LOW can humans stoop? Don't forget the case of little 10 year old Eleanor Briggs, returning home after her injection of anti-toxin on reaching the front porch collapsed crying, "I am dying" . . . and she DIED.

The "promoters" of this dangerous vaccine give NO GUARANTEE or NO ASSURANCE that it will not KILL your child . . . so . . . why should you take a chance?

ISN'T IT A FACT . . . that one of Dr. Salk's "instructors," a few years ago, came out with a vaccine? It was injected into innocent children many of them contracting polio and many DIED . . . the "instructor" then committed SUICIDE.

ISN'T IT FACT . . . that Dr. Salk himself stated that after he had injected his serum into "test" children that he couldn't sleep for a few nights? Sickening . . . isn't it?? . . . Yet, he wants to use your child as a "human guinea-pig."

In Los Angeles, after a wide spread and intensive vaccination campaign was waged, according to Dr. Dale, County Epidemiologist, estimates there were approximately 4,000 CASES OF POLIO JUST ONE MONTH AFTER THE VACCINATION CAMPAIGN as compared with only 14 CASES the YEAR BEFORE.

Innoculation is NOT based upon any scientific FACT, but upon "it's supposed to do" and "it seems to do" and "we believe it does" and so forth. It is "supposed" to produce antibodies, antigerms and antigens. These are "myths."

NO VACCINE HAS OR CAN ACHIEVE IT'S INTENDED PURPOSE. Vaccines have only filled countless cemeteries with innocent victims killed prematurely by FRAUDULENT injections.

Smallpox and other plagues were eradicated by sanitation engineers AFTER all vaccines and serums had FAILED COMPLETELY.

Gamma Globulin (scientifically a FRAUD) was such a COMPLETE FAILURE that the March of Dimes had to come up with something new to keep the DOLLARS rolling in. Now, they plan to inject this unproven, unapproved, unscientific, DANGEROUS vaccine into the bodies of little innocent children for NO REASON in the world other than to protect their "racket." All vaccines against all diseases have always left in their paths DEATH and ill health.

Scientist and physician, Dr. William F. Koch, M.D., Ph.D., says, "the injection of any serum, vaccine, or even penicillin, has shown a very marked increase in the incidence of POLIO, at least 400%. Statistics on this are so conclusive, no one can deny it."

The famous Doctor Harry R. Bybee says, "My honest opinion is that vaccination is the cause of more disease and suffering than anything I could name." Doctor William H. Hay, M.D., in reporting on the Philippine vaccination program with a death rate running in places to almost 70% says, If the record of vaccination in the Philippines were ever to become a matter of general knowledge it would FINISH vaccination.

In the Philippines in a period of three years following compulsory vaccination, occurred the greatest smallpox epidemic in Philippine history . . . with 162,503 cases and 71,453 deaths. In 1918, 47,369 of those vaccinated came down with Smallpox . . . 16,477 DIED. In 1919 . . . 65,180 were stricken with Smallpox . . . 44,408 DIED.

Among our own soldiers, in the Philippines, 674 were stricken from the vaccination and 249 DIED.

Diphtheria vaccine . . . under our Army's orders in Japan . . . killed 61 infants in a single group in a single night. These are FACTS . . . not fancies. You cannot prevent any disease by poisoning the blood stream. The pharmaceutical houses would like to forget the "epidemic" in Dallas, Texas, and surrounding towns when their "antitoxins" killed 100 children and ruined the health of thousands.

In Japan, by compulsion, EVERYONE is vaccinated for smallpox but, they had 285,061 cases of smallpox and 77,500 DEATHS.

DON'T subject YOUR child's nervous system to the TERROR . . . SHOCK . . . and DANGEROUS result of this "SERUM" injection operation. The sudden "shock reaction" following the injection of serums given to children is HORRIBLE!!

Our Creator SEALED our blood streams . . . it should be kept PURE and UNBROKEN and not "polluted" by QUACK "medicos" for the mere benefit of The March of Dimes unscrupulous "money-grabbers," who from its very inception have conducted a colossal FRAUD.

Dr. T. M. Schippell of Washington D. C., writes, "Parents—play safe! Let other callous parents permit this poisoning of their children. Just take your youngster off candy, soft drinks and colas and infantile paralysis will pass your family by. Remember, polio is not 'catching'—it comes from the insides of 'over indulged' kiddies."

THE AMERICAN MEDICAL ASSN. HAS NOT APPROVED DR. SALK'S SERUM

POLIO PREVENTION, Inc. Coral Gables, Florida

ORDER TODAY!!
100 Reprints only $1.00 (Postpaid)
Send 25¢ for a complete file of our factual Polio literature.

Anti-polio vaccine flyer from the 1950s: An early harbinger of today's anti-vaccination movement.
Credit: Sandra Blakeslee

It's often said that journalism is the first draft of history. I hope that's true because I possess, in seven full-size filing cabinets in my garage, an unvarnished account of twentieth-century science as observed and reported by three generations of science writers—my grandfather Howard H. Blakeslee; my father, Alton L. Blakeslee (both science editors of the Associated Press

from 1925 to 1985); and myself, Sandy Blakeslee, as a science reporter for the *New York Times* beginning in 1968.

In this year of coronavirus confinement, I've taken up the task of sifting through these twenty-eight file drawers, page by flimsy page, to document what (may I say) prominent science writers deemed worthy of dissemination. I've only managed to comb seven drawers so far, but the findings are fascinating, ranging from the important to the wacky.

Important topics include the Atomic Age and Manhattan Project, the Kinsey Report, exploration of Antarctica, eugenics, war, and the discovery of antibodies, REM sleep, dendrites, and macrophages. Then there's a lot on prefrontal lobotomies, about which Alton used to say, "I'd rather have a bottle in front of me than a prefrontal lobotomy."

Imaginative stories abound. To wit, a hissing sound to shake fog out of airports, how to sex day-old chicks, and some odd facts and curious claims, such as that eyes retain crude images of a murderer after death and U.S. Senators' brains are two ounces heavier than Congressmen's brains. My favorite so far: an admonition to doctors that the so-called bedside manner should not include kissing the patient. There is a lot on X-rays from the late 1920s to mid-1950s, such as you can X-ray newborn babies' hands to predict height, treat sinus infections in children with X-rays, and take X-ray pictures of a living brain via holes drilled in the skull.

Not surprisingly, many articles are what we today consider politically incorrect.

Not surprisingly, many articles are what we today consider politically incorrect. Files are sprinkled with reports about (then-clinical) terms, including *morons*, *imbeciles*, *idiots*, *cretins*, and *the feebleminded*. Sexism? You bet. Short skirts contribute to bedlam. Habits that make a girl a good employee make her a bad mother. And childbirth anesthetics kill love for children. Another favorite: Your wife's brain is as good as yours.

I also found treasures within the five enormous folders on polio and the Salk vaccine. Some of the information is prescient: doctors must give plasma in the first few days of infection for the treatment to work (which apparently holds true for COVID-19). Some is nonsense, such as that chiropractors can cure polio.

And some is prelude to today's rampant anti-vaxxer movement. A flyer from the early 1950s (see previous page) crows that "fake polio vaccine may kill *your* child." Its language—inoculation for immunity is strictly a "theory" and the practice of inoculation makes the body "unclean"—fits right in with current internet screeds on the perils of vaccination. Reading it makes you realize nothing much has changed in the scientifically illiterate mindset that prevails in this country. As attacks on current COVID-19 vaccines inevitably mount in the disinformation social mediasphere, it may help to recall that such attacks have been around for decades. While they can cause real harm, given enough time they also fade into old filing systems.

It makes you realize nothing much has changed in the scientifically illiterate mindset that prevails in this country.

Sandra Blakeslee, a third-generation science writer, is retired after forty-five years with the *New York Times*. She is a fellow of the Committee for Skeptical Inquiry and lives in Santa Fe, New Mexico.

CFI Libraries Redesigns Website

Timothy Binga

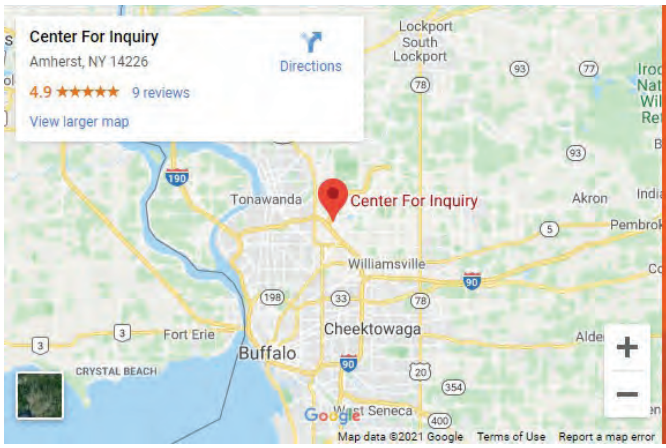
During the pandemic, many of the "normal" library functions of research, teaching, education, reference, etc., have slowed down significantly. As a result, we here at the Center for Inquiry Libraries have had an opportunity to catch up on many of the functions that take a back seat to other time-sensitive duties.

One such item was a total reworking of our website, CFILibraries.org. I personally managed it in the past but could not update it often enough to redesign it to current standards. This past summer, the CFI Web Department took over the job and redesigned the entire site.

This past summer, the CFI Web Department redesigned the entire CFI Libraries website.

They converted it to WordPress, which our other websites at CFI use, and made it conform to our other CFI websites' design. My job now will be to add more content, such as A to Z lists, bibliographies, finding aids, and other resources.

I thank the Web Department—Marc Kreidler, Alexander Nicaise, and



Where We're Located

The Center for Inquiry Libraries (CFI Libraries) are located across from the North Campus of the University of Buffalo in Amherst, NY.

Our Contact Information

1310 Sweet Home Rd
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(716) 636-4869

You can also get in contact with our Head Librarian, Timothy Binga, through the phone or by email at tbinga@centerforinquiry.org

Michael Powell—for their hard work and Lori Roux from Cybertools for Libraries, who allowed us to have some flexibility with the licensing of our Library Management software to make the redesign possible.

The CFI Libraries, located at CFI's headquarters in Amherst, New York, contains a vast array of books, documents, and periodicals, including the John and Mary Frantz Skeptics Library, the premier library of skepticism in the world. Topics covered include critical thinking, evolution, science, the paranormal, pseudoscience, quack medicine, skepticism, the supernatural, and urban legends. The Libraries also includes works on philosophy, rationalism, atheism, agnosticism, religious criticism, freethought, humanism, and separation of church and state. It also includes the papers and books of Paul Kurtz, Martin Gardner, and Gordon Stein as well as the Steve Allen Notebooks. Its rare books collection includes various first editions of Thomas Paine's *Age of Reason*.

The CFI Libraries continues to support the work of the skeptical movement and CFI, and, as always, we accept donations of library materials (books, periodicals, and so forth). For further information on how to donate materials to the libraries, please contact Timothy Binga by calling (716) 636-4869 ext. 210 or via email at tbinga@centerforinquiry.org.

Timothy Binga is director of the Center for Inquiry Libraries.

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[INVESTIGATIVE FILES JOE NICKELL

Joe Nickell, PhD, is CSI's senior research fellow. A former stage magician and private detective, he has also been a consultant in cases of homicide as well as various mysteries of the "strange" variety.

Incredible Vanishings and the Case of Ambrose Bierce

American writer Ambrose Bierce (1842–1914?)—in his collection of mystery and horror tales, *Can Such Things Be?* (1893)—included a trilogy of stories of incredible disappearances. They are not mere accounts of missing persons such as those that police and private detectives are involved in every day. Instead, in each instance the disappearance has elements of the supernatural.

Bierce's own disappearance in late 1913 seems both a fitting and ironic end for a writer fascinated by such mysterious vanishings—but was it something more? I undertook to solve the case, and it became part of my doctoral dissertation, *Literary Investigation* (Nickell 1987). Subsequently, Bierce biographer Roy Morris Jr. (1995) accepted and developed my solution. Come with me now as we track the fabled author, from clue to hidden clue, to his final destination. First, however, it will be instructive to look briefly at a story of the kind Bierce found so fascinating.

Figure 1. American writer Ambrose Bierce in a photograph from the 1890s. (Getty Images/Bettmann Collection. Used with permission.)

A Vanished Boy

Frank Edwards, in his tantalizing book *Strangest of All* (1962, 102), asks: "Is it possible for a human being to walk off the earth? Science says that it is not, but if that is correct then what happened to Oliver Larch?"

Edwards tells the story of an eleven-year-old boy who disappeared on the night of Christmas Eve 1889 from his family's farm at the outskirts of South Bend, Indiana. The boy had been sent to the well to fetch water, but just after he started on his errand, he was heard screaming: "Help! Help! They've got me! Help! Help! Help!"

Family and visiting friends rushed outside, with Oliver's father carrying a kerosene lamp. Oliver's cries were already growing faint, and lamplight revealed that his tracks led about halfway to the well and then ended abruptly! Writes Edwards: "There were no other

marks of any kind in the soft snow. Just Oliver's footprints … and the bucket … and silence." Subsequent investigation, the writer states, proved the truth of the story. Neither eagles nor even a balloon, he argues, could have made off with the frightened boy. And he concludes: "Because it defied logical explanation, the disappearance of this boy was quietly filed away and forgotten" (Edwards 1962, 103).

I began my investigation of that case in May 1979. Exhaustive searches of local records were made for me by the Services Division of the South Bend Police Department and the Northern Indiana Historical Society. Alas, neither the fantastic disappearance nor any record of such a family could be discovered. After much further effort, I traced the tale back through earlier versions—eventually reaching its original: Although different in many details, it was still recognizable by its major story elements as Ambrose Bierce's short story titled "Charles Ashmore's Trail" (Bierce [1893] 1924, 421–424).

One of Bierce's trilogy of "Mysterious Disappearances," the story tells how a sixteen-year-old lad fails to return from an errand to fetch water from a spring; subsequently, his tracks are found to cease suddenly in the snow. Two other supernatural tales complete Bierce's group: one has a planter walking across the pasture and disappearing in full view of his wife and a neighbor, while the other features a runner who stumbles in a footrace only to vanish before touching the ground. The stark *purposelessness* of these stories embodies Bierce's personal philosophy that life is essentially meaningless. We must keep this in mind as we consider his fascination with disappearance stories and whether that may have led to his own mysterious vanishing.

Bierce did not originate the genre of "mysterious disappearances"—or "Fortean disappearances," as they are now often called (after Charles Fort, who loved to taunt "orthodox" scientists with reports of strange occurrences they could not explain). The genre is, in fact, ancient. For example, Hebrews 11:5 reads, "Enoch … was not found, because God translated him," i.e., took him away. And at the end of Sophocles's play *Oedipus at Colonus* (fifth century BCE) Oedipus mysteriously vanishes. Then there is the 1807 case of Benjamin Bathurst, who was a very real person. He indeed disappeared under mysterious circumstances; however, because he was a diplomat carrying dispatches on a mission, he was presumed assassinated. As might be expected, one version of that case is of the Fortean variety (O'Donnell 1972, 52–92).

The stark *purposelessness* of these stories embodies Bierce's personal philosophy that life is essentially meaningless.

I suspect that the Fortean genre evolved from two main sources: first, actual missing persons such as Bathurst and, second, from tales of presumed "apparitions" common to ghost stories. The latter frequently tell of someone encountering a figure that then suddenly vanishes, leading the witness to conclude it must therefore have been a *spirit* that was seen.

Disappearing Bierce

Ambrose Bierce was born in 1842, the son of an Ohio farmer. He distinguished himself as a Union soldier in the Civil War, at the close of which he was, he claimed, breveted a major. He subsequently worked as a Treasury clerk in San Francisco. From about 1868–1900, he became a journalist and editor in San Francisco—except for some three years in London where he achieved a reputation as a humorist. In 1900, Bierce moved permanently to Washington, D.C., where he published additional collections of stories, a collection of verse, and a cynical lexicon (later known as *The Devil's Dictionary*). He also assembled the first ten volumes of *The Collected Works of Ambrose Bierce*.

By 1912, Bierce was well into the final phase of his life, an old and rather bitter man. He had suffered a failed marriage, the death of his son Leigh in 1901, and an abortive attempt at remarriage in 1910. He was tired, suffered from asthma, and began to plan what seems clearly intended as a final journey. By about October 1913, he headed south and west. A news clipping, reputedly sent to his niece in a letter of November 6, said, in part: "Mr. Bierce was dressed in black. From head to foot he was attired in this color, except where the white cuffs and collar and shirt front showed through. He even carried a walking cane, black as ebony." In one letter he wrote, "Don't know where I shall be next. Guess it doesn't matter much" (Nickell 2005, 22–23; Pope [1922] 1967, xiv–xvi, 189, 195–198).

By the time Bierce ceased to be heard from, in late 1913 or early the next year, speculation about his whereabouts and fate were beginning to circulate. He had told reporters he was heading to Mexico to check on the revolution there: "To be a Gringo in Mexico—ah, that is euthanasia!" This was almost certainly a ruse, but stories of his involvement there—either with Pancho Villa's forces or, on the other side, with the Carranzistas—proliferated like later Elvis Presley sightings. In fact, the U.S. government had been unable to confirm that Bierce had crossed into Mexico (Nickell 2005, 22–27).

Nevertheless, conjecture reigned, and Bierce would have loved it. If he reportedly died, again and again in Mexico—killed in battle, stood in a firing squad, or just summarily murdered—it must have been his ghost that later appeared briefly in France, as an officer on Lord Kitchener's staff, only to vanish again. One scenario was based on the supposition that the writer ended his days in the State Asylum in Napa, California, where his dear friend Carrie Christiansen lived out her last years. Bierce was everywhere, elsewhere, and nowhere—spotted rather frequently for one who had, supposedly and ironically, disappeared (Nickell 2005, 23–25, 32–33).

What Actually Happened

Toward the end of his life, Bierce was burned out. He had written a powerful essay advocating suicide titled "Taking

Oneself Off," in which he insisted, "Suicide is always courageous" (Bierce [1909–12] 1966, 338–344). He wrote farewell letters to friends, saying to one, "My work is finished, and so am I"; to another, he said he longed for "the good, good darkness"; and to still another, he stated, "I am going away and have no notion when I shall return" (see Pope [1922] 1967, 189, 195–198). In fact, he had put his affairs in order—permanently.

A few of Bierce's friends, such as Carrie Christiansen, appear to have been in on his ruses to fool everyone else. Only his close friend Walter Neale later gave up what he knew, Bierce having confided his basic plan to him. According to Neale, approximately a year before he vanished, "he took a journey through Yellowstone National Park, explored part of the Cañon of the Colorado, and somewhere in the gorge of the Colorado selected the place of his last earthly habitat." That occurred in the summer of 1912, but as early as 1910, Bierce had written of the Grand Canyon, "I'd like to lay my bones thereabout" (quoted in Pope [1922] 1967, 164).

Bierce showed Neale "a photograph of the exact location, which I think he himself had taken with a kodak, and pointed out that there he would be protected from vultures." Bierce had often vowed to die by his own hand as a refusal to suffer the debilities of old age, and, Neale reported, Bierce had a German revolver for the purpose. Neale explains why Bierce may have ventured toward Mexico without actually going there: Bierce, he believed, took the Southern Pacific route to the Grand Canyon to avoid asthma, attacks of which had plagued him so on his last California-to-Washington, D.C., trip via a northern route that "he had to interrupt his journey several times" (Neale [1929] 1969, 429–439).

Neale's account rings true, and it is corroborated in its main parts by the foregoing evidence: Bierce's essay on suicide, his last letters, and the fact of his settled affairs. Finally, and I use that word with emphasis, there is the revealing letter Bierce sent his daughter in early 1913 giving up his cemetery plot. The letter ends with the statement that he did "not wish to lie there. That matter is all arranged and you will not be bothered about the mortal part of [signed] Your Daddy" (quoted in Grenander 1971, 73).

To complete his disappearing trick, Bierce needed only a distracting puff of smoke, so he furthered the illusion that he had crossed the Mexican border. He seems to have played games with his final communications. A "last letter" was supposedly destroyed as per Bierce's orders and exists only among other colorful, suspicious notebook entries (penned, I observe, in Miss Christiansen's handwriting). That phantom letter was reportedly datelined "December 25, 1913," and headed "Chihuahua, Mexico," but the American consul could not find evidence Bierce was ever in that town. There are other examples of his subterfuges: regarding one letter he headed with an anticipated future place and date, he would subsequently confess, "Thus does man's guile come to naught"; in a postscript to another, he cautioned, "You need not believe all that these newspapers say of me and my purposes. I had to tell them something" (see Nickell 2005, 22–31).

Conclusions

Perhaps Ambrose Bierce felt that although he could not cheat death, he could somehow cheat the grave. Carey McWilliams observed: "Nothing so augmented the interest in Ambrose Bierce as his disappearance. Obscurity is obscurity, but disappearance is fame." Bierce surely agreed. He had promised (quoted by Paul Fatout 1951, 208), "And nobody will find my bones." And so with his last act and by his own hand—as we can picture him in his rock niche, firmly gripping his revolver—Ambrose Bierce steeled himself and kept that promise. ■

Acknowledgments

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Vanished

(for Ambrose Bierce)

Your work
    finished,
    you vanished,
        wandered.
    Everyone
    won-
        dered.
You forsook
    your grave plot,
to make
    your way
    to a way-
        side spot,
have us look
    for nothing, or not.
Hidden
in a canyon,
    a place
to punctuate
your final thought—
before the skeletonizing rot—
    with the precise
period of a pistol shot.

Joe Nickell

[REALITY IS THE BEST MEDICINE HARRIET HALL

Harriet Hall, MD, also known as "The SkepDoc," is a retired family physician, a CSI fellow, and an editor of the *Science-Based Medicine* blog. Her website is www.skepdoc.info.

Hypnosis Revisited

Is hypnosis for real? Do people actually go into a trance, or is it just a matter of imagination and role playing? Some people swear by it. One website proclaims that your mind power is limitless:

> The highly focused, yet deeply relaxed state of mind achieved via hypnosis yields many great benefits, digging to the root cause of many of our mental, physical, and psychological problems. Used for centuries, the popularity of hypnosis continues to grow, as modern science embraces its life-transforming potential. (EOC Institute N.d.)

It is said to do everything from restoring memories of past lives to making people stop smoking. Is all that true? I'm skeptical.

History

Perhaps the first to describe the hypnotic state was Avicenna, a Persian physician who wrote about "trance" in 1027. Hypnosis was introduced to the modern world by Franz Mesmer, a German doctor whose treatments became known as *mesmerism*. Working in Paris in the late eighteenth century, Mesmer claimed that an invisible force he called "animal magnetism" influenced health. At first, he used magnets but then decided magnets were not necessary. He found he could get the same results by merely passing his hands over a patient's body. Later he treated groups of patients who sat around a "baquet" and were connected by iron rods and ropes; Mesmer made hand motions but did not touch the patients. The treatment provoked striking responses, such as vomiting or convulsions.

King Louis XVI wondered about Mesmer's methods. He appointed a Board of Inquiry to investigate. The Board, which included the scientific luminaries Antoine Lavoisier and Benjamin Franklin, concluded that Mesmer's results were due to belief and imagination rather than to any invisible energy. Benjamin Franklin wrote the majority opinion, calling Mesmer a fraud. The term *hypnotism* is derived from the

Greek word for *sleep*, but it has nothing to do with sleep. The word was popularized by James Braid, a Scottish surgeon who thought it was a mere contrivance to induce responses that were easily explained by ordinary psychological and physiological principles.

Through the years, there have been many advocates and practitioners of hypnosis as well as many skeptics. Much misinformation has surrounded hypnosis. Some thought it could be used to force a person to commit a crime (see "Beware Mesmer Thieves!" SI, November/December 2015). It was linked to popular music and satanic ritual abuse. Some saw it as a political threat, fearing the French could use it to subdue England. The opinions of religious people were mixed: some saw it as the work of the devil; others thought Jesus had practiced it. Mary Baker Eddy claimed animal magnetism could lead to moral decay and death.

Sigmund Freud was trained in hypnosis. He practiced it for years, using hypnotic regression to help patients recover repressed memories. But he eventually abandoned it in favor of psychoanalysis. He toyed with the idea of augmenting psychoanalysis with hypnosis, thinking it might hasten recovery but then deciding it might weaken the outcome.

Hypnosis has been depicted in books and movies, often inaccurately. The fictional hypnotist Svengali exploited a young girl with evil intent. In Edgar Allan Poe's short story "The Facts in the Case of M. Valdemar," a man was hypnotized at the moment of death and continued to speak from beyond the grave.

Fun with Hypnosis

In his autobiography, Mark Twain wrote about his experience with a stage hypnotist who performed in Hannibal, Missouri, for two weeks. Twain was fifteen at the time and liked the idea of getting all that attention, so after failing to be hypnotized several nights in a row, he went along with the suggestions and pretended to be hypnotized. Soon Twain was the hypnotist's only subject and the star of the show. He relates how they fooled everyone in town except for a few skeptics. Many years later, Twain tried to set the record straight by confessing the deception to his mother. She refused to believe him, insisting vehemently that he *really had been hypnotized*!

I heard about a local dermatologist who had a patient with a rash on his arm that wouldn't heal because he kept scratching an unexplained itch. He hypnotized the patient and suggested that instead of scratching, the patient would drop whatever he was holding when the itching started. It worked beautifully. It seems the itching was triggered whenever his wife criticized him or nagged him, usually at the dinner table. He didn't consciously remember the suggestion, but he followed it faithfully, dropping his fork, food, water glass, or whatever was in his hand at the time. Without knowing why, the wife became conditioned to stop nagging him. I guess she got tired of cleaning up the mess.

My Personal Experience

I was taught in medical school to think of hypnosis not as a trance but as the selective attention/selective inattention (SASI) state produced by strong suggestion. Attention is focused, and subjects ignore all other sensory inputs. Readers might accuse me of being unfair, saying I shouldn't knock it until I tried it. But I *have* tried it. In medical school, I participated in group sessions and found it very relaxing and enjoyable. We were given the useful posthypnotic suggestion that we would never succumb to "highway hypnosis" and fall asleep at the wheel. I still remember the warning and have never been in danger of falling asleep at the wheel (but probably not because of the posthypnotic suggestion). I also had an individual experience during my residency training when another doctor hypnotized me and suggested I had an area of decreased sensation on my arm. An orthopedic doctor examined me and was appropriately puzzled until we revealed the trick. I even tried self-hypnosis but quickly lost interest. It produced a nice, relaxed feeling, but I didn't think it was worth the time and effort involved.

Hypnosis Today

Today hypnosis is widely used for many purposes, from entertainment to forensics to medical treatment to self-improvement. Some think it is an

Some think hypnosis is an altered state of consciousness; others call it a placebo, an interaction with a therapist, or an imaginative role enactment.

altered state of consciousness; others call it a placebo, an interaction with a therapist, or an imaginative role enactment. Scales of "hypnotizability" have been devised, and some therapists have estimated that up to 25 percent of the population can't be hypnotized.

Retrieving Lost Memories

When I attended an airplane accident investigation course in the U.S. Air Force, we were taught that hypnosis could retrieve lost memories and should be used on witnesses to help them remember forgotten details such as the numbers on license plates. That's simply not true. It doesn't retrieve actual memories but encourages subjects to fantasize and create false memories. Hypnotherapy to retrieve repressed memories of childhood sexual abuse is more likely to result in tragedy than truth: people who were falsely accused have gone to jail. Under hypnosis, people are more suggestible and more open to fantasy and imagination, and it is impossible to distinguish between a true event and a fantasy. Psychological studies have shown that memory is unreliable. It doesn't record like a video camera but is instead malleable. Every time we recall something, it can be subtly altered or confused with another memory. False memories are easy to create and can seem more real than true memories.

Age Regression

In age regression, subjects are asked to return to an earlier time in their lives. They confabulate, making up false memories that can't be independently confirmed. They talk as they imagine a child of that age would talk but not the way a child of that age really talks.

Past-Life Regression

Past-life regression has been thoroughly debunked. It is a method that uses hypnosis to recover memories of past lives, requiring a belief in reincarnation. In the case of Bridey Murphy, a housewife recalled living in the nineteenth century as an Irish woman. Her story seemed very convincing, but careful investigation completely discredited it. Fact checking proved many of the details false, and the ones that were true were determined to be a result of *cryptomnesia*. She had remembered things she had heard or seen during childhood, but she had forgotten the source of the memories. Curiously, those who report past lives usually claim to have been important people such as Cleopatra or Napoleon, not common swineherds or kitchen maids. The details they relate can't be corroborated, and they can't properly speak the language they would have used in the previous life.

The Military

Hypnosis was investigated by the military. They found no evidence that it could be used for military applications.

Surgery

There are reports of patients undergoing surgery with hypnosis instead of conventional anesthesia, but they are not properly documented, and no conclusions can be drawn.

The Scientific Evidence

There is no objective way to tell whether a person is hypnotized. We have to rely on self-reports and observations of their behavior. If the person claims to have amnesia for what happened during hypnosis, we can't rule out the possibility that the memory still exists somewhere in the person's brain. One intriguing study divided subjects into two groups. One group was hypnotized, and the other group was asked to just pretend they were hypnotized. Their behavior was identical. Moreover, all the effects attributed to hypnosis have been replicated without hypnosis.

The scientific evidence is far from convincing, and hypnosis is categorized by many medical organizations as a form of alternative medicine. Medical applications of hypnosis have been widely studied in clinical trials. There are reports of its success for smoking cessation, but a 2019 Cochrane systematic review of published studies found no clear evidence that hypnosis was effective (Barnes et al. 2019). For weight loss, when hypnosis was added to cognitive behavioral therapy, it increased success rates. It has been found useful for managing pain and reducing anxiety about surgery.

In Robert Baker's book *They Call It Hypnosis*, he claims there is no such thing as hypnosis. He says it is a form of learned behavior and compliance with the suggestions of an authority figure.

So, Is It Real?

After reviewing the evidence, I'm not convinced that the "hypnotic trance" is a real thing. The procedures used to induce hypnosis are tricks that focus attention, reduce peripheral awareness, enhance the patient's response to suggestion, and encourage fantasy. I will continue to think of hypnosis as the SASI state of selective attention/selective inattention. The ability to focus and direct one's thoughts is undoubtedly very useful in many contexts, but hypnosis is not the only way to achieve that goal. Cognitive behavioral therapy and meditation can accomplish some of the same things. I wouldn't mind being hypnotized again to recreate the enjoyable relaxation I experienced; however, I wouldn't rely on it to retrieve a memory, replace anesthesia for surgery, or do all the other things hypnosis is claimed to do. And I don't intend to ever go on stage and act like a chicken! ■

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The Tragedy of Our Commons

Credit: Pixabay

Not long ago I was scrolling through Instagram when I saw a video of people in Perth, Australia, gathering in small crowds outdoors, no face coverings in sight. From my perspective in the United States, where an average of over 2,000 people a day were dying of COVID-19, it was a somewhat shocking image to see. But these bare-faced people were not attending a political rally or an anti-mask protest; they were at the opening of a ride/experience called "Flight" that involved "binaural audio" and hydraulic movements inside a large shipping container. The people in the video looked very happy.

A little bit of investigation revealed that, with respect to the COVID-19 pandemic, Australia was a very different place than the United States. For example, the day before I wrote this sentence (December 10) Australia (population 25.5 million) had six new cases of COVID-19 and no deaths; the United States (population 330 million) led the world with 226,762 new cases and a record 3,260 deaths.[1] Adjusted for population size, Australia's infection rate on that day was equivalent to seventy-eight new cases in the United States. What a dream that would be.

Life in the winter of 2020 was very different in Australia. The pictures in the tweet on page 21 are of a meeting at the University of Technology in Sydney, Australia (population 5.2 million), on December 9. You will notice that people are a bit more spaced apart than they might have been before the pandemic, but they are indoors and not wearing masks. The university's COVID-19 instructions advised anyone who was feeling sick to stay home and required that everyone coming to campus check in using a QR code. Smartphone apps and QR codes were commonly used when people entered buildings to facilitate contact tracing should someone be exposed to the virus. But life was going on in Australia with a kind of freedom that

Prof Bronwyn Hemsley
@BronwynHemsley
So lovely to see colleagues - say Happy Christmas and thanks for the year that was like no other @UTS_Health @UTS_GSH - and sadly some goodbyes to staff leaving #covid19slp
5:21 PM · Dec 9, 2020 · Twitter for iPhone

Photos from a meeting at the University of Technology, Sydney, Australia. (Credit: @BronwynHemsley on Twitter)

was impossible in the United States.

Australia is not the only country to get beyond the virus. The epidemic has been over in China (population 1.4 billion) for months, and there have been no deaths since April. Vietnam (population 97 million) had its last death in early September. The success story in New Zealand (population 4.8 million) continues, with three deaths since late May, the last of these in mid-September.

There are many circumstances that produce the kind of results these countries have enjoyed, but one factor appears to be setting the right goal. In the United States, the Centers for Disease Control and Prevention (CDC) recommended that the criterion for opening up states be a fourteen-day decline in the number of cases (Centers for Disease Control and Prevention 2020)—which was not consistently adhered to by all the states. As a result, the country never reached an average infection rate of lower than 20,000 cases per day. There were other criteria involving the number of available intensive care beds and test positivity rates, but the country never adopted the goal of driving the daily cases to zero. In contrast, all the countries that have successfully gotten beyond the virus set a goal of complete elimination and maintained their restrictions until they had come as close to that mark as possible. These countries gave the virus no safe harbor, and as a result they recovered their freedoms.

Successfully achieving the goal of elimination of the virus using non-pharmaceutical intervention requires several factors, but one clear requirement is national unity. In his new book, *Apollo's Arrow: The Profound and Enduring Impact of Coronavirus on the Way We Live*, physician and sociologist Nicholas A. Christakis made the following prediction: "Some countries will undoubtedly manage it better than others, and my guess is that the nations that fare the best will be the ones with high public trust and strong science-based leadership" (Christakis 2020, 101–102).

Christakis wrote that sentence back in August, and it is clear that he was on target. All the countries mentioned earlier that have returned to normal life mounted unified responses. China and several other Asian countries had prior experience with SARS-CoV-1, and mask use was already a common part of life. They also have far more communitarian cultures than most Western countries. China achieves much of its national unity through authoritarianism, but national unity and trust of the government are common in Asian countries, making strong responses to COVID-19 possible. Nightclubs are open in Wuhan, Singapore, Taiwan, and Japan, although hours were recently shortened in Osaka (Everington 2020; Gable 2020; Johnson 2020). In Australia, the biggest outbreak was in Melbourne, in the southern state of Victoria, and rather than a goal of X number of days of declining cases, the state set out to eradicate the virus. In an effort to curb the spread, transportation between states was curtailed, and compliance with the restrictions was quite good (Scott 2020). New Zealand has had clear messaging from the beginning. In her coronavirus briefings, Prime Minister Jacinda Ardern has frequently referred to "our team of five million" (Togoh 2020).

Europe has been a more difficult location for control of the disease, but even there the effect of national unity can be seen. The Scandinavian countries all enjoy a relatively high level of trust in government (Helsingen et al. 2020), and, with the possible exception of Sweden, their response to the outbreak has been very good. Sweden famously did not impose strict lockdown rules and adopted a herd immunity approach, which led to many more deaths than in neighboring countries. In June, Sweden's top epidemiologist expressed regret about the strategy they chose and said that in hindsight they should have employed a stronger approach ("Coronavirus: Sweden's Tegnell Admits Too Many Died" 2020).

To show the effectiveness of the Scandinavian response, I produced the graph in Figure 1 using the tools of the coronavirus page of Our World in Data (ourworldindata.org). Infection rates are strongly affected by testing rates, so I plotted COVID-19 deaths adjusted for

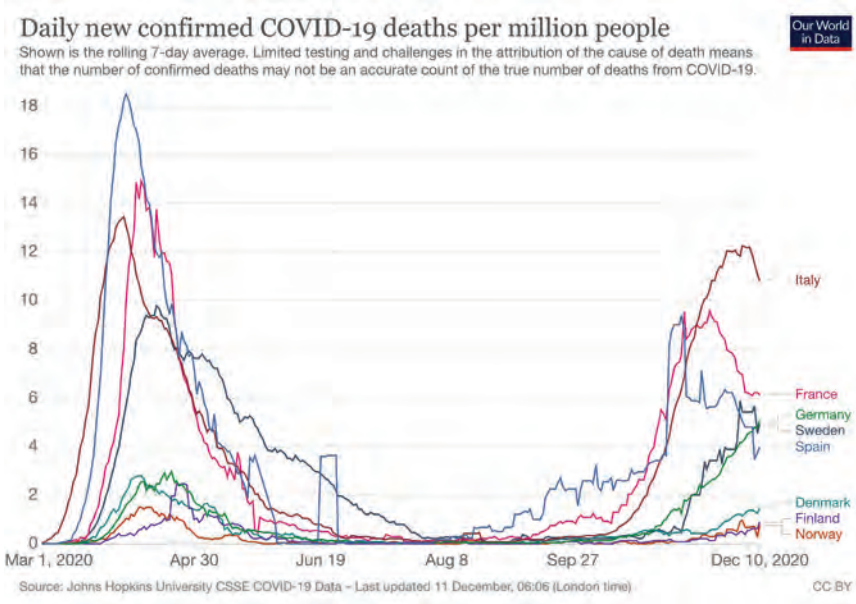

Figure 1. Daily COVID-19 deaths per million population for the Scandinavian countries and selected western European nations.

the populations of the countries. The first wave of the outbreak shows two distinct groups of responses. The highest death rates were seen in the western European group—minus Germany—and Sweden, and the lowest rates were seen in the remaining three Scandinavian countries. Early in the epidemic, Germany was praised for its response, but by May anti-lockdown protests organized by the *Querdenker* ("lateral thinking") movement began to emerge (Deutsche Welle 2020). As the second wave took off in late autumn, the same three Scandinavian countries formed a group with much fewer deaths, but Germany's second surge was larger, placing it back in a pack with the other European countries and Sweden.

When discussing the successful containment efforts in Australia and New Zealand, some have pointed out that these are island nations that benefit from the absence of land boarders with other countries, but a wider comparison of island countries suggests that water barriers aren't a deciding factor. Figure 2 shows COVID-19 deaths per million for the island nations of Australia, New Zealand, Japan, Singapore, Ireland, and the United Kingdom. All but one of these countries have done quite well. In the first wave, both Ireland and the United Kingdom experienced a steep increase in deaths before topping out at fourteen per million per day, but in the second wave the picture was very different. In December, the United Kingdom was witnessing another surge in infections and deaths, but Ireland avoided a substantial increase in deaths during the second wave. A possible reason for the difference can be seen in the politics of the two nations.

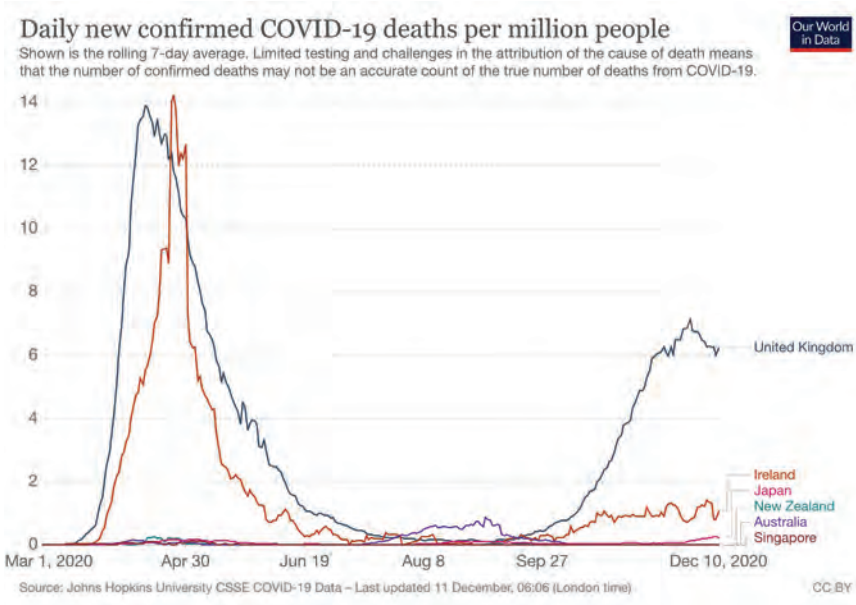

Figure 2. Daily COVID-19 deaths per million population for a select group of island nations.

In an article in *Time* magazine in June, global health policy experts Gavin Yamey and Clare Wenham pointed out that in October 2019, just months before the coronavirus crisis emerged, the Global Health Security Index (https://www.ghsindex.org/) ranked the United States first in epidemic preparedness—out of 195 countries—and ranked the United Kingdom second. How could they have gotten it so wrong? Yamey and Wenham suggest the ranking was so glaringly off the mark because "It did not account for the political context in which a national policy response to a pandemic is formulated and implemented." Both countries have "illiberal populist" leaders and bitterly divided political environments. Britain has an ongoing second crisis over Brexit, which was decided by a narrow margin in a national referendum, and the United States has a gaping red-blue divide that, as I write this, can be seen most clearly in the controversy over the 2020 presidential election. In days following the election, over 70 percent of the members of the losing party reported they did not believe the election had been free and fair (Bekiempis 2020).

An interesting contrast can be seen in the political landscape in Ireland and in the Irish response to the coronavirus. Unlike the United Kingdom, Ireland remains in the European Union and has shown notable unity in recent years. Since 2015, Ireland has had two important national referenda: in 2015 to legal-

ized gay marriage and, in 2018, to overturn the country's thirty-five-year ban on abortion. Both these referendums spurred #HomeToVote efforts aimed at getting Irish citizens living abroad to come home to vote, and both were won by large majorities. In 2018, over 66 percent of the electorate voted to approve a constitutional amendment legalizing abortion. In the United States, it is difficult to imagine many political issues that 66 percent of the electorate could agree on. The last president to win by a popular vote margin of over 66 percent was James Monroe in 1820. Similarly, the Brexit referendum in the United Kingdom was decided by less than four percentage points.

Following the first wave of the coronavirus epidemic in Ireland, compliance with public health guidance has been very good. Pubs that do not serve food are closed, but pubs that serve food are open. As of early December, retail stores were preparing for a vigorous holiday shopping season.

In a statement on December 12, Ireland's chief medical officer, Dr. Tony Holohan, singled out the important contribution made by young people (National Public Health Emergency Team 2020):

> Ireland currently has the lowest incidence in Europe and has protected against the significant mortality and severe illness that many European countries, as well as the United States, have experienced. Our younger generation led the way, with the incidence in the 19-24 year age group reduced from 432 per 100,000 population to 41 per 100,000 population. This is an enormous achievement. We all need to recognise how well our younger generation has reduced their contacts and helped to protect the whole population. We all now need to follow this example in the weeks ahead.

The Tragedy of Our Commons

The economic concept of the Tragedy of the Commons was first introduced in 1833 by British economic writer William Forster Lloyd but was perhaps most clearly described by biologist Garrett Hardin in 1968. Simply stated, when individuals share a resource to which they each have free access, there will be a tendency to use it all up, causing disaster for all. In the classic example, cattle farmers share a common grazing field, but the field has a limited capacity to support the herd. Under free market conditions, each farmer will get the entire benefit of adding another cow to their herd, and the cost of this action—slightly depleted grass—will be shared among the farmers. Using this calculus, it is always better to add more animals to one's herd than not, but the end-point of all this rational self-interest is starvation for all.

Today, this conflict plays out two blocks from where I am sitting. The village of Stonington, Connecticut, is home to one of the last fishing fleets in the area, and the fishers are constantly at loggerheads with state regulators. The state's Department of Energy and Environmental Protection sets limits on the numbers of fish commercial fishers can pull from the ocean—not because they are mean but to protect the long-term viability of the fishing beds for everyone (Department of Energy and Environmental Protection N.d.). Despite the obvious benefits of these rules, the fishers have a long-running battle with regulators to increase the allowable size of the catch. Soon after the 2016 election, the town docks were decorated with a large red sign featuring a picture of Donald Trump that said, "President Trump, Make Commercial Fishing Great Again."

In the case of the coronavirus crisis, the common fields that we all share are the economy, the healthcare system, and the very air we breathe. People who advocate for removing health restrictions and assert their individual freedoms to gather together without masks and defy the health recommendations spoil

In the case of the coronavirus crisis, the common fields that we all share are the economy, the healthcare system, and the very air that we breathe.

those common goods for us all. Other countries pulled together to rid their countries of the virus, save lives, and restart their economies long before vaccines were available. Meanwhile, the U.S. economy has been crippled for nine months. The unemployment rate, which had been below 4 percent in February, briefly hit 13 percent in May and remains at over 6 percent today with job growth leveling off. According to data from Yelp, Inc., 80,000 businesses shuttered between March 1 and July 25 (Ngo 2020). With cases rising in the U.S. winter wave, these economic trends will continue until and if widespread vaccination builds herd immunity.

A House Divided

In 1858, after accepting the Illinois Republican Party's nomination for the Senate, Abraham Lincoln gave one of his most famous speeches beginning with the lines: "A house divided against itself, cannot stand. I believe this government cannot endure permanently half slave and half free."

In October 2020, Pew Research conducted an international survey of people who thought their country had done a good job confronting the coronavirus crisis (Dimock and Wike 2020). When respondents were separated by people who did and did not support the governing party, the United States had the greatest divide. Seventy-six percent of supporters of the governing party thought the nation had done a good job with the coronavirus, compared to only 29 percent of those who did not support the governing party. This 47 percent split was substantially greater than the other countries surveyed. By comparison, in both Australia and Denmark, supporters of the ruling party gave a 98 percent approval of their country's coronavirus response and those not supporting the party gave 93 percent approval—a mere five-point split. Canada and Germany both showed eleven-point splits. All these countries have done substantially better than the United States in combatting the pandemic.

The United States appears to be the most politically divided country in the world at this moment. And—perhaps it is just a coincidence—but we also have the largest number of coronavirus infections and deaths. There must be someone who benefits from the political divisions we see on our TV screens every day, but it isn't the people dying from COVID-19, the business owners filing for bankruptcy, or the workers who've lost their jobs. In the short run, the vaccines may bring an end to the pandemic, but the damage left in its wake will not be wiped out so quickly. Meanwhile, there are new and unknown challenges ahead. As long as our house remains divided against itself, we remain vulnerable. ■

The United States appears to be the most politically divided country in the world at this moment, and we also have the largest number of coronavirus infections and deaths.

Note

1. All coronavirus statistics in this article, apart from the graphs, are drawn from Worldometer.com.

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The Pointlessness of Pet Acupuncture

Q: **Have you done an investigation into pet acupuncture? What's the story behind that?**
—M. Downey

A: Pet acupuncture is not a topic that has gotten much specific attention from skeptics. It's not widely practiced among professional veterinarians, though it does have its adherents. Many fields are inherently sketchy, acupuncture and psychic phenomena among them. When applied to nonhuman animals, the claims get exponentially more dubious. One key issue is falsifiability: Can the claim be proven true or false, proven or disproven?

The basic premise of acupuncture is that needles placed at certain points on the body, often along imagined meridian lines, can be used to manipulate the body's imagined energy field and thus treat or cure myriad medical maladies. A full skeptical analysis of acupuncture is beyond the scope of this column, but suffice it to note that different acupuncture traditions use different acupuncture points. Like other pseudosciences, including astrology and dowsing, there's not even any agreement on the fundamentals of the practice—such as where to place the needles on the body. It varies by person and practice; some

The author looking suitably skeptical outside a pet acupuncture clinic in Los Ranchos, New Mexico. Photo by Shana Pedroncelli.

acupuncturists manipulate the body's presumed energy fields only in certain places, such as the ear or hand. Others claim it needs to be done all over the body—and there's no universal agreement about where those places are, with pretty much anywhere on the body being claimed by someone or other as an important meridian. The lack of standardized, stringent research methods and practices might be understandable for a new therapy, but proponents claim that acupuncture has been practiced for thousands of years. (It hasn't, and even if it had been, it's troubling that millennia of practice hasn't led to improvement.)

In the real world, it can be difficult to prove correlation—and cause and effect relationships even more so. This is why the gold standard for research in many fields is a randomized, controlled, double-blinded study. That doesn't mean that other study methods (cross-sectional, case-controlled, etc.) are necessarily flawed or invalid, just that they don't have the power of higher-quality studies. This is especially applicable to acupuncture claims and *especially* to pet acupuncture claims.

One of the main challenges with scientifically testing acupuncture is that people tend to know whether or not they're being stuck with needles. It's kind of a hard thing to miss, though some researchers have attempted to control for this confounder by using sham needles (for example, ones that don't actually penetrate the skin) or putting the needles outside of the designated meridian lines (presumably the treatment wouldn't work a few centimeters in any direction off the lines).

One review (Moffet 2009) examined thirty-eight acupuncture trials and found that "Most studies found no statistically significant difference in outcomes, and most of these found that sham acupuncture may be as efficacious as true acupuncture, especially when superficial needling was applied to non-points." Overall, the study concluded that "The findings cast doubt on the validity of traditional acupuncture theories about point locations and indications. Scientific rationales for acupuncture trials are needed to define valid controls, and the theoretical basis for traditional acupuncture practice needs to be re-evaluated."

To the extent that acupuncture "works," it's largely due to the placebo effect—and because pets can't know or understand that the needles being put in them are supposed to relieve pain, the placebo effect can't work on them. Unlike humans, animals can't communicate reports of *reduced* pain—that can only be indirectly inferred by observation, and of course that raises the problem of observer (pet owner) bias.

Because pets can't know or understand that the needles being put in them are supposed to relieve pain, the placebo effect can't work on them.

As with most types of alternative medicine, virtually all the "evidence" for pet acupuncture is anecdotal. Animals may exhibit a problem behavior (such as crying) and then stop when their owner or another person does something different or new (such as spending time treating the pet), and in many cases the behavior might change. This is seen by many as validating the treatment, but it's a classic example of the logical fallacy *post hoc ergo propter hoc* (after this, therefore because of it). Animals are sensitive to cues, and it could be that doing *anything* different would have fixed the problem—paying more attention to the animal, taking it to any new place (including a pet psychic or acupuncturist's office), etc. Any change in behavior may have nothing to do with the specific treatment. The owner may also re-interpret the behavior in a different way, subjectively deciding that the pet *seems* better after a treatment.

If the condition doesn't improve, that does not necessarily demonstrate to the pet owner (or acupuncturist) that the premise underlying pet acupuncture is inherently flawed. After all, no medical treatment—even on people—is completely effective all the time on all patients. It's easy enough to rationalize away any failures.

David Ramey of the ever-useful *Science-Based Medicine* blog examined animal acupuncture, noting:

> Acupuncture points haven't been shown to exist in animals (or people, for that matter). In fact, the acupuncture charts devised for animals are inventions of the 20th century, made by "transposing" one of the myriad human charts directly onto animals. That's one reason why horses have a "gall bladder" meridian (putative channels which connect acupuncture points, which also haven't been shown to exist), even though they don't have a gall bladder. But, when it comes to animal acupuncture, there's apparently no absurdity sufficiently large to cause practitioners any embarrassment. (Ramey 2009)

As for the scientific literature, well, it's sparse. Continues Ramey:

> One can occasionally find positive studies, especially if the studies have been poorly designed. There have been two reviews on veterinary acupuncture. One, looking at the evidence across all animal species, concluded that there wasn't enough compelling evidence to either support or refute the practice; the other, in horses, concluded that there wasn't good evidence to support the practice, and that the best studies were uniformly negative. (Ramey 2009)

As far as treatments go, acupuncture itself is relatively safe. There are some minor risks to any acupuncture (mostly from contaminated needles), but at least nobody is cutting open bodies or introducing dangerous drugs to the patient. The bigger dangers are the fact that whatever malady the pet is actually suffering from isn't being treated and the time and money wasted on ineffective treatments. ■

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Facts, Theories, and Best Explanations

PETER J. MARSTON

Both in my classrooms and in public forums, I have seen most discussions of the relative merits of evolution and creationism falter due to confusion over use of the terms *theory* and *fact*. Creationists try to challenge the validity of evolution by asserting that it is merely a theory, while evolutionists counter by asserting that evolution is plainly a fact. This creates an impasse; because the terms are presumed to be mutually exclusive, there is no semantic space in which to reconcile them. No progress is made, either in persuading the persuadable or improving the ability of evolutionists to engage in constructive dialogue with those who discount or dismiss evolution.

I recommend a more productive and, in my view, more accurate expression to describe evolution: namely, evolution is the *best explanation* for the diversity of life forms on Earth, including humans, and for the deep connections that exist among all terrestrial life.

My principle method in approaching extraordinary claims is rhetorical and operates on two fronts. First, it concerns the ways in which discourse advancing extraordinary claims appeals to various audiences. I have found one of the best ways to promote skepticism is to reveal the rhetorical strategies (and attendant sophistries) that are used in paranormal and pseudoscientific discourse. While people are generally resistant to being "wrong," they are considerably less defensive about being "fooled" (Marston 2014). Second, it seeks to develop more effective and constructive rhetorical strategies that may be employed by skeptics in their efforts to convert the credulous. My comments here are rooted in this second front.

I recommend a more productive expression to describe evolution: namely, evolution is the *best explanation* for the diversity of life forms on Earth.

Facts

Facts are, of course, statements that are true. They are typically beyond dispute and therefore noncontroversial. To establish a disputed statement as a fact in any discussion requires clear evidentiary demonstration. To be productive in dialogue, however, such evidentiary

demonstration must secure the adherence of all interlocutors. Indeed, *unilaterally* asserting a statement as a fact is counterproductive and ends discussion, disqualifying those who dispute the fact as recalcitrant. For this reason alone, it is not rhetorically effective to claim that evolution is a fact when engaging creationists or seeking to persuade those who attend such debates and discussions. This is especially true for young people encountering tension between what is taught in their biology classes and what is preached in their homes.

Asserting evolution as a fact is rhetorically problematic, because while facts are true statements, that is not the *only* feature of a fact (thus, not all true statements are best characterized as facts). Belgian philosopher Chaïm Perelman (1969) notes that facts are atomistic and immutable. That is, inferences based upon facts may change, and new facts may be discovered, but the facts themselves do not change. So, examples of facts might be statements such as "The Green Bay Packers won the 1967 Super Bowl," "My father passed away of a heart attack," "The Bill of Rights was ratified in 1791," and so on. From this perspective, I find that asserting evolution as a fact exposes an advocate to critique based upon the many advances and refinements in evolutionary theory over the past two hundred years, for evolutionary theory is by no means immutable—it is a remarkably dynamic and robust area of scientific research. Now, advocates of evolution may object that when they assert that evolution is a fact, they are *not* asserting that evolutionary *theory* is a fact but rather that the biological *phenomenon* is a fact. Fair enough, but when discussing evolution, it is virtually impossible to avoid this equivocation between the biological phenomenon and the theories that seek to explain it. It may therefore be best to sidestep the issue by avoiding the F-word.

Theories

Theories are sets of concepts held together by explanatory relationships. It is fair to say that, in a sense, evolution is a theory and, judging by the titles of countless books written by biologists on the subject, this characterization is not hostile to evolutionists. Of course, creationists add the modifier *mere*, either explicitly or tacitly (by contrasting theories with facts), and this is patently unfair. However, responding to the claim that evolution is not a *mere theory* by claiming evolution is a plain fact reinforces—even if unintentionally—this specious bifurcation and risks incoherence, if indeed it is sensible to describe evolution as a theory. (Again, we see the rhetorical effects of the nearly intractable equivocation I referenced in the previous paragraph.)

Even if we were successfully able, in discussions with creationists, to tease out the *ways in which* evolution is a theory and the *ways in which* it is a fact, we would still have moved the argument into territory that is likely too sophisticated and subtle for lay audiences: namely, the distinction between "mere" theories and established theories. To demonstrate that evolution is the latter and not the former simply does not redress the critique that evolution is still a theory, leaving in the minds of nearly all creationists—and a fair proportion of other lay people—the impression that evolution is somehow less than "true," at least in the sense that facts are true.

Best Explanations

For these reasons, I suggest that evolutionists simply step away from the whole tangle of the fact-versus-theory debate, by presenting evolution as the *best explanation* for the development of life on Earth, including the emergence of humans. "Best explanations" need not face the critiques that disputed "facts" typically do and that characteristically render dialogue and debate unproductive. Presenting evolution as *our best explanation* both diffuses such critiques and relieves advocates of evolution of a burden of proof that is, frankly, of little relevance to the debate. Indeed, evolutionists are best served by directing attention precisely to the central question: Which better accounts for the diversity of life and the development of species—evolution or creationism?

Which better accounts for the diversity of life and the development of species—evolution or creationism?

Note that in some areas of skeptical inquiry, this view of facts, theories, and best explanations is well established. Joe Nickell, in his many Skeptical Inquirer columns, is especially disciplined in offering his conclusions as best explanations (e.g., positing bears as the most likely object in Bigfoot sightings or hypnagogia as our best explanation for many ghost "sightings"). But in other areas, the problem I describe here arises in a very similar manner, most notably in the issue of climate change, which is generally characterized by a struggle over "facts" and "theories." The better armed skeptics are rhetorically, the more effective they will be. ■

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The Many Valuable Contributions of Scott O. Lilienfeld, Scientist, Skeptic, and Colleague

D. ALAN BENSLEY

My friend and colleague Scott O. Lilienfeld died on September 30, 2020, far too soon, at the age of fifty-nine (see obituary in January/February 2021 Skeptical Inquirer, 10–11). Scott wrote an amazing twenty-five articles for Skeptical Inquirer and in total more than 350 articles before his untimely death. Readers can come to appreciate his many important contributions to psychology and the skeptical movement through his clear, incisive, and entertaining writing, just as I did.

I first encountered Scott's writing in an article on the dangers of pseudoscience in clinical practice that he had written in honor of his winning an early career achievement award (Lilienfeld 1998). However, I did not meet him until 2005 at a national conference on the teaching of critical thinking in psychology. He was friendly and gave my students and me some encouraging words about research on decision making that we were presenting.

Throughout his life, Scott was a great reviewer, editor, and collaborator. After serving as an editor of the prestigious *Journal of Abnormal Psychology*, he became the founding editor of *The Scientific Review of Mental Health Practice*, a journal featuring articles on pseudoscience in relation to evidence-based practices in psychology. In one of his many productive collaborations exposing the dangers that pseudoscience and low-quality science pose for clinical practice, he discussed problems with the Rorschach Test, a widely used—but poorly supported—projective test (Wood et al. 2003). His eleventh SI article, on projective tests, continued in this vein (Garb et al. 2003). He followed this by editing his influential book *Science and Pseudoscience in Clinical Psychology*, which reviewed numerous pseudoscientific clinical practices. Perhaps more importantly, it also reviewed evidence-based alternatives (Lilienfeld et al. 2015). In 2007, he wrote a comprehensive and shocking review of scientific studies showing that certain mental health practices could harm (and in rare cases actually kill) the people they were supposed to help. For instance, ten-year-old Candace Newmaker's therapists smothered her during a "rebirthing" procedure in which they wrapped her in a blanket to simulate the birthing process. They falsely assumed that this pseudoscientific treatment would attach her to her new guardian the way natural birth was thought to (Lilienfeld 2007).

Although I followed Scott's work during this time, I did not talk to him again until after the publication of his wonderful little book *50 Great Myths of Popular Psychology* (Lilienfeld et al. 2010). The book discusses many common misconceptions, including the mistaken belief that people use only 10 percent of their brains; that venting your anger is a good way to reduce aggression; and that raising students' self-esteem is a good way to improve their academic performance. Scott and his coauthors convincingly debunked these and many other myths with reviews of high-quality scientific research. That book revealed not only the breadth of Scott's psychological knowledge but also his gift for making psychology informative and fascinating while helping readers improve their critical thinking skills.

When I next saw him at the annual meeting of the Association for Psychological Science, I told him that I thought we could develop a test of psychological misconceptions based on the *50 Great Myths* book. He encouraged me to start, and our nine-year collaboration was launched, as we developed the Test of Psychological Knowledge and Misconceptions and other measures. Our first study with the new test showed that students who tended to endorse more psychological misconceptions also tended to rate more highly the scientific basis of pseudoscience and poorly supported practices, as well as endorse more paranormal beliefs. They also tended to endorse a more intuitive and less rational scientific thinking style, while scoring lower on a critical thinking skills test (Bensley et al. 2014).

More recently, we added measures of belief in conspiracy theories to our research, showing that people who tend to believe in false and fictitious conspiracy theories also tend to endorse more psychological misconceptions, pseudoscience, and paranormal claims (Bensley, Lilienfeld, et al. 2020).

Working with Scott was both fun and instructive. At each stage of our projects, he provided new ideas and useful feedback. If I sent him the draft of an article, he assured me that he would return comments within a few days. To me, this would have meant I would have it done at the end of a few days; for Scott, it meant returning his comments in about two days. Yet his comments provided detailed and constructive criticism. I especially appreciated how he expanded the development of our theoretical explanations of our findings.

Collaborating with Scott led to a great increase in my productivity. But it amazed me that at the same time he was also collaborating with many other scholars on research projects that differed greatly from ours. These included his important work on the psychology of personality and psychopathology and his warnings with Sally Satel about the dangers of uncritical evaluation of neuroscience (Satel and Lilienfeld 2013a; Satel and Lilienfeld 2013b). In his last few years, he was editor of *Clinical Psychological Science*, the flagship clinical psychology journal of the Association for Psychological Science. All the while, he greatly supported the teaching of psychology, publishing in teaching journals, giving presentations at national teaching conferences, and consulting with psychology programs. Notably, he was first author of an innovative introductory psychology textbook that incorporated strategies for improving critical thinking and the rejection of pseudoscience and psychological misconceptions (Lilienfeld et al. 2009). He also coauthored an entertaining book to help students think critically about pseudoscience (Heinzen et al. 2016).

Needless to say, Scott was an indefatigable worker. While sick, during the last year of his life, he coauthored an article with me on assessment of unsubstantiated beliefs (Bensley and Lilienfeld in press). He also collaborated with us on a large study predicting endorsement of psychological misconceptions, paranormal beliefs, and conspiracy theories from various thinking dispositions, such as intuitive thinking style, scientific skepticism, and cynicism (Bensley, Watkins, et al. 2020). Despite my urging him not to overdo it and only contribute as much as he was comfortable, two weeks before his death, he asked me if there was anything else he could do to help with the article.

At the same time, Scott coauthored with his students two Skeptical Inquirer articles, one ("The Nobel Disease") published in the May/June 2020 issue and the second in the September/October issue. In this last article, they made two important points: that intellectual humility should be a guiding principle of the skeptical movement and that psychological research on this individual difference could inform us about the nature of modern skepticism (Lilienfeld et al. 2020).

Few other psychologists have done more to bring psychology to the skeptical movement.

Few if any other psychologists have done more to bring psychology to the skeptical movement and warn psychologists about the dangers of pseudoscience. The skeptical movement and psychology have lost an influential scholar, researcher, colleague, mentor, and friend. The good news is that his far-reaching influence lives on in his writings and in the fond memories of his students, colleagues, and collaborators. If you were not fortunate enough to know Scott Lilienfeld in life, you can still meet him in the many fine written works he left us. Readers can search for his SI articles at skepticalinquirer.org. ■

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LIFE, THE QUNIVERSE, AND EVERYTHING, PART 1

STEPHANIE KEMMERER

QAnon is the ultimate conspiracy—the mothership; the "Choose-Your-Own Adventure" saucerful of codes and secrets. Some ex-followers help our investigator examine its dangers and delusions.

This article was completed well before the events of January 6 at the U.S. Capitol. QAnon followers were among the leading participants in the assault.

In the 1999 film *The Matrix*, the entire plot pivots on a choice that Neo must make. He must choose between a red pill and blue pill; the red pill will wake him up, and the blue pill will allow him to go back to life as he has always known it.

The film, with its clever mix of action and philosophy, is still as relevant today and may in fact be more relevant than when it premiered. Its pill metaphor has become inevitably enmeshed in the primordial stew of conspiratorial thinking and has been adopted by almost every fringe ideology.

Those "in the know" are considered the "red-pilled" or "woke," while the rest of us "blue-pilled sheeple" toil away in our lives, unaware or unwilling to accept the existence of the "Deep State." The blue-pilled stay asleep, while the red-pilled are schooled in the secret forbidden knowledge—that is somehow readily available for anyone to see online. Perhaps far more menacing than those who become red-pilled are those who give into "black-pilling," a sense of utter indoctrinated nihilism embraced by many mass shooters and incels (dangerous loners who often devolve to the point of violence).

Enter QAnon, the ultimate conspiracy—the mothership; the umbrella; the "Choose-Your-Own-Adventure" saucerful of secrets and codes. (To be clear, QAnon is not officially affiliated with the Guy Fawkes–mask-wearing hacktivists known as Anonymous.)

QAnon first appeared in October 2017 on the message board 4chan. This anonymous poster was not the first "Insider Anon" to attempt trolling the masses. There were several other Anon accounts, but QAnon stuck.

"Q" claimed to have top secret Q Clearance, which is in fact an actual thing. Q began posting Nostradamus-esque riddles and codes and links, like an online scavenger hunt. Q's ultimate secret? That Hollywood, financial, and political elites were secretly controlling the world all the while engaging in Satanism, pedophilia, torture, and cannibalism to extract adrenachrome—a chemical said to prolong life—from children. This myth is not new and played a part in another topic I investigated.

While I was writing the three-part series on Nazi occultism for the podcast *Even the Podcast Is Afraid*, I dove into the origins of fascism prior to World War II. One of the most enduring and damning culprits that led to the Holocaust was a completely debunked, fictional—and plagiarized—book titled *The Protocols of the Meetings of the Learned Elders of Zion*, commonly known as *The Protocols of Zion*. This book emerged in 1903 and claimed to tell the "true" story of a meeting of a secret cabal of Jewish people who controlled the world.

The QAnon conspiracy takes heavily from this concept,

Q's ultimate secret? That Hollywood, financial, and political elites were secretly controlling the world all the while engaging in Satanism, pedophilia, torture, and cannibalism.

and indeed at its core, almost every false conspiracy theory ends up somehow naming the evil culprits as those of Jewish descent.

Hollywood, financial, and political elites? It doesn't take a bulletin board filled with red strings and pushpins to decode what that means. Nor does it take much to understand the roots of the QAnon concept of Satanic cannibals who indulge in a sort of "blood sacrifice." This stems all the way back through the centuries to the Blood Libel Myth, which has somehow just been regurgitated through the years, being molded to fit the zeitgeist of any particular era.

Declaring one's enemies Satanists is an ancient trope as well. It would be difficult for anyone to support such evil. In actuality, true Satanism, as defined by Anton LaVey, the founder of the Church of Satan, is nothing more than atheism spiced up with a bit of mysterious "magick" and sexual ambiguity. A careful reading of LaVey's *The Satanic Bible* shows it is nothing more than a misinterpretation of the made-up text *Enochian Aethyrs*, with certain "angelic" words changed to "demonic" ones. Because most people who buy into Satanic Panic are oblivious to the historical, etymological, and mythological roots of this concept, Satan is just the ultimate bad guy stripped completely of his classical antihero roots and cast off into the darkness.

Using the ultimate evil to inflict damage against the ultimate good is the most fallacious, conspiratorial basis for any misguided belief system. But it works, time and time again.

Clever too is the idea of adding children into this mix. While Satan represents the most evil force ever imagined, children represent the most innocent and fragile of humans. Maybe you can get away with giving Satan a pass, but how could anyone, ever, possibly condone the torture, rape, and murder of children?

Using the ultimate evil to inflict damage against the ultimate good is the most fallacious, conspiratorial basis for any misguided belief system. But it works, time and time again. And it persists like the stains on Lady MacBeth's hands.

QAnon is also a stale leftover slice of "PizzaGate," which emerged right before the 2016 election. It seemed to fade, and then it came back with a vengeance and morphed into QAnon and later on "WayfairGate," which emerged in early 2020 when people began speculating that expensive industrial cabinets with human-sounding names were really children being sold online.

The absurdity of QAnon might not have spread as far if it had remained where it had started. The Chan message boards are not for the casual internet user, so at the start, QAnon was not widespread or easily accessible. The problem began when the Chan users began sharing "Q Drops" (posts) on mainstream social media platforms. This made the Q "crumbs" easy for widespread "baking." (Q's codes are called "crumbs" or "breadcrumbs," and followers are encouraged to "bake the crumbs" into whatever nonsense they choose.)

There are even QAnon aggregator sites such as QAnon.pub, which contain all the Q Drops ever posted. While these aggregator sites usually attract QAnon followers, they are also utilized by reporters and podcasters for legitimate research.

Another cryptic and biblical tenant of QAnon is their belief in "The Storm." "The Storm Is Upon Us" is one of their catchphrases. So much energy has been put into the importance of this storm, yet no one—not even Q, who may in fact be several people—has defined what exactly "The Storm" even is. Anything can be "The Storm," and a lot of time and energy has been put into defining what it is. QAnon followers, once they have received their "red-pill" indoctrination, declare that they have experienced "The Great Awakening."

QAnon plays into the fantastical notions and concepts of heroic identity. Disgraced (and recently pardoned) General Michael Flynn, made a dog whistler reference to QAnon in one of his speeches, saying, "We have an Army of Digital Soldiers." QAnon followers rejoiced at this and adopted the moniker "Digital Soldiers." This is their ultimate fantasy; their ultimate LARP (Live Action Role Playing). QAnon is

a never-ending LARP; these "digital soldiers" brave the battlefields of the internet with memes and hashtags as their weapons. ("Meme War" is another term used by QAnon followers. Nothing about QAnon is decidedly new or original, and even their main catchphrase, "Where We Go One, We Go All," was borrowed from a line in the film *White Squall*.)

Perhaps the most unapologetically comical aspect of the QAnon conspiracy is the "Jesus" figure; the force for ultimate good: Donald Trump, the man who in only four years reduced every core value of American democracy into a nonstop rally of contrarian beliefs, dog whistles to neofascist politics, and absolute pandemonium. Setting aside all the other ridiculous plot twists of QAnon, Donald Trump as the hero lies somewhere in between hyperbole and sheer lunacy. But this characterization of Trump as the savior has led to the spread of Q. While not every Trump supporter is a follower of QAnon, every QAnon follower is a supporter of Trump.

Setting aside all the other ridiculous plot twists of QAnon, Donald Trump as the hero lies somewhere in between hyperbole and sheer lunacy.

At its core, QAnon represents one of the most extreme examples of fundamentalist, dominionist Christian, right-wing belief systems. According to an internal FBI memo, QAnon—like many right-wing conspiracy organizations—has been classified as a potentially terroristic threat, and the conspiracists are often listed as hate groups by the Southern Poverty Law Center. Former "Moonie" cult member, deprogrammer, and author Steven Hassan has classified QAnon as a cult on his Freedom of Mind organization website. (His book *The Cult of Trump* is highly recommended. I suggest the Audible version, because it includes actual clips of Trump speaking to illustrate Hassan's points.)

QApostates

The most dangerous aspects of the QAnon conspiracy cult are its erosive properties. While they have hijacked and hidden behind hashtags such as #SaveTheChildren, QAnon has actually been the cause of destroying lives and tearing families apart. On the SubReddit "QAnon Casualties," innumerable posters discuss how either their former belief in QAnon or a loved one's current belief has led to everything from the loss of a job to divorce. Families have been torn apart by a cultic belief that claims to want to "save the children."

Jitarth Jadeja is perhaps the most well-known former QAnon follower and was in fact catapulted to a sort of reluctant fame due to his postings on this SubReddit. Jadeja, who currently resides in Australia, says he was slowly drawn

into the dark world of QAnon after he experienced what can only be described as a sense of collective disillusionment and disbelief after Trump won the 2016 election. Jadeja began to question how such a thing could happen and began to seek alternative views of reality, because Trump's win represented the antithesis of reality as he had known it. He found himself gravitating toward Alex Jones, and the slippery slope finally landed him right into the gaping maw of QAnon.

I interviewed Jadeja by telephone.

The further he slipped into the "rabbit hole," the more he became withdrawn from the real world. "Everyone who falls into QAnon is miserable," Jadeja says. Oftentimes these people already have a mental or emotional instability, and they likely possess some form of social dysfunction as well as low self-esteem. But Q is there to pick them up: "QAnon tells them they can be a hero. It's about being a hero and getting credit for it," adds Jadeja.

Despite the cries about saving the "Mole Children" being kept as sex slaves in underground tunnels and their fury at some imagined "Deep State," QAnon is ultimately about one thing: "It's not about kids. It's not about the cabal. It's about being heroes," Jadeja says. Jadeja spent quite some time in the Q Hole, as a follower from December 2017 until June 2019.

The tipping point came for him after a Q post predicted that Trump would use the phrase "Tippy top." (Q Drops that turn out to be "true" are called Q Proofs; sometimes the drops themselves are meant as a proof, such as the "Tippy Top" post.) Jadeja discovered that while Trump did use the phrase as predicted, he also found that it is a phrase Trump has used repeatedly in the past. That was the moment Jadeja realized he had been lied to. It was a moment of harsh self-realization.

From his experiences, looking back, he was able to see all of the clues that it was fake, clues that he could not see at the time he was enmeshed in it. QAnon is all about the misuse of information and a clever PsyOp of disinformation. (PsyOp is short for Psychological Operations, which is used by the military and defense agencies. It is the usage of tactical psychology, akin to some of the concepts of Sun Tzu's *The Art of War.*) The way out of QAnon is through facts and knowledge. "The more people know about it, the more likely they are to leave it," Jadeja told me. The QAnon crowd misuses information to suit their needs, while disregarding actual information. "People use data the way a drunk uses a lamp post—for support rather than illumination."

Jadeja was thrust into the world of the media after his recovery, when he began posting his story in the SubReddit. He began receiving requests for interviews and at first declined. He later realized that his story of recovery could possibly help others find a similar path. While Jadeja is by no means the only outspoken former QAnon follower, he says, "I'm the most visible."

Conspiracy culture received a gift in the form of the coronavirus pandemic. With more people stuck at home with more time on their hands (mixed with dangerous algorithms used on social media platforms and YouTube), more people began sinking into the darkness. The pandemic itself became

the center of many conspiracies, with many referring to it as a hoax or a "Plandemic."

One such casualty of the pandemic is Leila Hay from Northern England. She fell into QAnon right around the time the lockdowns began and emerged after only a short period of about six months. I was also able to interview her.

"I got out right before the point where I couldn't get out," says Hay, adding, "I have a network that's been very helpful to me." Hay points out two aspects of her personality that seem to apply to many QAnon followers: "I'm very obsessive. I'm also quite vulnerable." Her entry was by way of the algorithms used on YouTube, which has since wiped a lot of QAnon content from its platform. "It's a toxic environment; there's no real intelligence behind it."

Hay's escape from the Q Hole came by way of Twitter. She came across a page for a podcast titled *QAnon Anonymous*. Thinking it was a pro-QAnon podcast, she found herself drawn into the posts. She soon realized it was a decidedly anti-QAnon podcast, but she kept reading, emerging once more into the light.

The *QAnon Anonymous* podcast is inarguably one of the biggest thorns in the side of QAnon and Q "Adjacent" followers. The three hosts—Travis View, Julien Feeld, and Jake Rockatansky—present easily digestible and educated facts that debunk QAnon and other conspiracies. The episodes are well-researched, well-written, and often both frightening and hilarious at the same time. The hosts have even gone undercover to several QAnon rallies and conferences, most recently to one of the Arizona "Stop the Steal" post-election protests, where they encountered the "Frog Man" himself, Alex Jones.

Rockatansky expressed joy in hearing how they helped Hay escape the cult of Q. Diving so deeply into such a dark topic has its downsides for all three of the hosts. "We've had to figure out ways to keep ourselves grounded and not get taken along for the ride." He says the pandemic definitely played a very big role in the proliferation of Q but reiterates the importance of the 2016 election as well. "The whole world, their minds were broken by the event, and I think a lot of people were sure that one thing was going to happen and when it didn't happen, what they understand about the world was ripped away from them."

The *QAnon Anonymous* podcast is inarguably one of the biggest thorns in the side of QAnon and Q "Adjacent" followers.

"There's a corporate interest in driving division; in not being able to empathize with the people you're instructed to hate," he says. There is no way around it. America has become more divided in the past four years, and at the helm of this divisive ship is Trump, steering us straight toward an iceberg at full speed.

It wasn't just Fox News that gave Trump his popularity. Rockatansky points to mainstream media as well, which have been on "a four-year 'hate tour' to make up for the fact that they kinda created this guy." He says, "Our brains have been collectively cooked by [the] media, especially post–Cold War American films from the '80s and '90s. People are still trying to fit reality into archetypes that were created then."

Rockatansky stresses that one of the most unique aspects of QAnon is its real-time malleability and ability to adjust to events as they occur. "I think they know that battle can never be won because it's not real. … You always get to be angry; you always get to be fighting. It's a comfortable place. … The fun of it is that it gets to keep going. There's never going to be any real answers. Once you have answers, you're never going to be satisfied with them."

Now, in the aftermath of the 2020 election, with the outcome being decidedly what Q did not predict, QAnon followers are in a state of doubled-down denial, sentiments that are disturbingly being echoed by other elected officials and newly elected officials such as Marjorie Taylor Greene, who will soon be our most "red-pilled" member of the House of Representatives.

Some QAnon followers have made threats against their own lives or those of their families if Trump does not maintain his stranglehold on the presidency. Despite the new conspiracies that arose in the wake of Joe Biden's historic win and Trump's refusal to concede, as of January 20, 2021, at noon, there will be a new president. But how far will QAnon followers go when that happens?

Fredrick Brennan (a.k.a. "Hot Wheels"), the original founder of the message board 8chan (now known as 8kun), has made some very frightening predictions of what may come along with the change of power on January 20.

Brennan is not only the original founder of 8chan; he also lived in the Philippines and worked alongside Jim Watkins. Watkins has been in the spotlight in the aftermath of the election, spouting conspiracies about the Dominion voting system. Watkins has a stake in these conspiracies. He has formed a Q Caucus and stands to profit from the proliferation of QAnon. Some speculate that Watkins may actually be Q. If he isn't, he has a direct line of communication to whoever is.

Brennan ultimately remanded ownership of 8chan to Watkins in 2015. (Q originally began posting on 4chan in October 2017 but migrated to 8chan on September 19, 2018.) 8chan ultimately turned into a cesspool of filth, with many users posting images of child pornography and racist rhetoric. 8chan had also included postings from persons who later went on to commit mass shootings.

Of QAnon followers, Brennan says, "They haven't had to reckon with the Biden administration, and that is the thing we were afraid would lead to violence. … I don't necessarily see bright times ahead at least for political violence. … When Trump is officially out of office, I just don't know where their narrative can go next."

Brennan points to this bizarre doubling-down and says, "As far as they're concerned there's going to be a second

Trump administration. … I don't know how some of them move on" from Biden's win. He says there is a very real possibility that "some of them might be willing to commit violent acts." Of the QAnon followers who have been arrested in recent years, he says, "What we've seen are some of the dumb ones get[ting] caught."

Brennan has been unabashedly outspoken against Watkins and 8kun in recent years. His opinions on Watkins even led to a last-minute escape from the Philippines, where he had resided for several years. Brennan made a social media post that made reference to Watkins possibly having dementia. Due to the strict libel laws in the Philippines, Watkins (claiming to be a champion of "free speech") pressed charges.

Even a few hours in a jail cell, especially in the Philippines, would almost certainly lead to Brennan's demise. His nickname "Hot Wheels" refers to the fact that he is wheelchair bound. He is a very small man and was born with osteogenesis imperfecta ("brittle bone disease" such as depicted in the film *Unbreakable*). Knowing he would not survive jail, Brennan fled from the Philippines just in the nick of time.

Brennan is very knowledgeable and has been a staunch fighter of the Q cult. Brennan has had firsthand experience with Watkins and the tumult and controversy surrounding Watkins and his unapologetic grifts. Brennan was never a believer in QAnon, yet his journey shares similarities with those who have left the Q cult, and like the stories that stem from Q, his journey is still unfolding.

With QAnon, the battle is one that never ends and one that can never be won. It is a real-time epic fight between good and evil, with the goal posts constantly moving and the enemies ever increasing. The damage it causes to people can be so life-altering that there is no turning back, but as with Jadeja and Hay as proof, there is hope for recovery and a life out of the darkness—a life that is productive and filled with logic, science, and reason. ■

Part 2 will appear in the next issue of Skeptical Inquirer.

Acknowledgments

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Stephanie Kemmerer is a researcher and writer for the podcast *Even the Podcast Is Afraid* and an occasional contributor for the *Southern Oddities* podcast, both owned by Ordis Studios (https://www.ordisstudios.com/). She currently resides in Sunnyvale, California, and is interested in true crime, the paranormal, politics, and conspiracy culture. The podcasts are available on all streaming services. Her Twitter handle is @mcpasteface. She wrote "The Unexplained Files: TV Mystery-Mongering" in our January/February 2014 issue.

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Science: The Gold Standard of Truth

Wanton attacks on scientific truths and even the existence of truth itself are profoundly troubling. Science's history is a spectacular cascade of truths.

RICHARD DAWKINS

What is truth? You can speak of moral truths and aesthetic truths, but I'm not concerned with those here, important as they may be. By *truth* I shall mean the kind of truth that a commission of inquiry or a jury trial is designed to establish. I hold the view that scientific truth is of this commonsense kind, although the methods of science may depart from common sense, and its truths may even offend it.

Commissions of inquiry may fail, but we assume a truth is lurking there even if we don't have enough evidence. Juries sometimes get it wrong, and falsehoods are often sincerely believed. Scientists, too, can make mistakes and publish erroneous conclusions. That's all regrettable but not deeply sinister. What is profoundly troubling, however, is any wanton attack on truth itself: the value of truth, the very existence of truth. This is what concerns me here.

What is profoundly troubling is any wanton attack on truth itself: the value of truth, the very existence of truth.

George Orwell's O'Brien held that two plus two equals five if the Party decrees it so. The "Ministry of Truth" existed for the purpose of disseminating lies. In the past four years, the U.S. government has moved in that direction. World-weary cynics sigh that all politicians lie; it goes with the territory. But normal politicians lie as a last resort and try to cover it up. Donald Trump is in a class of his own. For him, lying is not a last resort. It never occurs to him to do anything else. And far from covering up a lie, his well-named "base" will love him the more for it and will believe the lie, however far-fetched and shamelessly self-serving. Fortunately, Trump is too incompetent to fulfil Orwell's nightmare, and anyway he is on the way out—albeit kicking and screaming and trying to pull the house down with him as he goes.

A more insidious threat to truth comes from certain schools of academic philosophy. There is no objective truth, they say, no natural reality, only social constructs. Extreme exponents attack logic and reason themselves, as tools of manipulation or "patriarchal" weapons of domination. The philosopher and historian of science Noretta Koertge wrote in Skeptical Inquirer in 1995 (and things haven't gotten any better since):

> Instead of exhorting young women to prepare for a variety of technical subjects by studying science, logic, and mathematics, Women's Studies students are now being taught that logic is a tool of domination … the standard norms and methods of scientific inquiry are sexist because they are incompatible with "women's ways of knowing." The authors of the prize-winning book with this title report that the majority of the women they interviewed fell into the category of "subjective knowers," characterized by a "passionate

rejection of science and scientists." These "subjectivist" women see the methods of logic, analysis, and abstraction as "alien territory belonging to men" and "value intuition as a safer and more fruitful approach to truth."

That way madness lies. As reported by Barbara Ehrenreich and Janet McIntosh in *The Nation* in 1997, at an interdisciplinary seminar the social psychologist Phoebe Ellsworth praised the virtues of the experimental method. Audience members protested that the experimental method was "the brainchild of white Victorian males." Ellsworth acknowledged this but pointed out that the experimental method had led to, for example, the discovery of DNA. This was greeted with disdain: "You believe in DNA?"

You can't *not* "believe in DNA." DNA is a fact. The DNA molecule is a doublehelix, a long spiral staircase with exactly four kinds of steps called nucleotides.

You can't *not* "believe in DNA." DNA is a fact. The DNA molecule is a double helix, a long spiral staircase with exactly four kinds of steps called nucleotides. The one-dimensional sequence of these four nucleotide "letters" is the genetic code that specifies the nature of every animal, plant, fungus, bacterium, and archaean. DNA sequences can be compared, letter for letter, between any creature and any other, much as one might compare folios of *Hamlet*. From this we can compute a numerical figure for the closeness of cousinship of any two creatures and, hence, eventually build up a complete family tree of all life. For, whether we like it or not, it is a true fact that we are cousins of kangaroos, we share an ancestor with starfish, and we and the starfish and the kangaroo share a more remote ancestor with jellyfish. The DNA code is a digital code, differing from computer codes only in being quaternary instead of binary. We know the precise details of the intermediate stages by which the code is read in our cells, and its four-letter alphabet translated, by molecular assembly-line machines called ribosomes, into a twenty-letter alphabet of amino acids, the building blocks of protein chains and hence of bodies.

If your philosophy dismisses all that as patriarchal domination, so much the worse for your philosophy. Perhaps you should stay away from doctors with their experimentally tested medicines and go to a shaman or witch doctor instead. If you need to travel to a conference of like-minded philosophers, you'd better not go by air. Planes fly because a lot of scientifically trained mathematicians and engineers got their sums right. They did not use "intuitive ways of knowing." Whether they happened to be white and male, or sky-blue-pink and hermaphrodite, is supremely, triumphantly irrelevant. Logic is logic is logic, no matter if the individual who wields it also happens to wield a penis. A mathematical proof reveals a definite truth, no matter whether the mathematician "identifies as" female, male, or hippopotamus. If you decide to fly to that conference, Newton's Laws and Bernoulli's Principle will see you safe. And no, Newton's *Principia* is not a "rape manual" as was ludicrously said by the noted feminist philosopher Sandra Harding. It is a supreme work of genius by one of *Homo sapiens's* most sapient specimens—who also happened to be a not very nice man.

It is true that Newton's Laws are approximations that need modifying under extreme circumstances, such as when objects travel near the speed of light. Those philosophers of science who fixate on the case of Newton and Einstein love to say that scientific truths are only ever provisional approximations that have so far resisted falsification. But there are many scientific truths—we share an ancestor with baboons is one example—that are just plain true, in the same sense as "New Zealand lies south of the equator" is not a provisional hypothesis pending possible falsification.

The physics of the very small also goes beyond Newton. Quantum theory is too weird for most human brains to accommodate intuitively. Yet the accuracy with which its predictions are fulfilled is shattering and beyond all doubt. If I can't get my head around the weirdness of a theory that is validated by such predictions, that's just too bad. There's no law that

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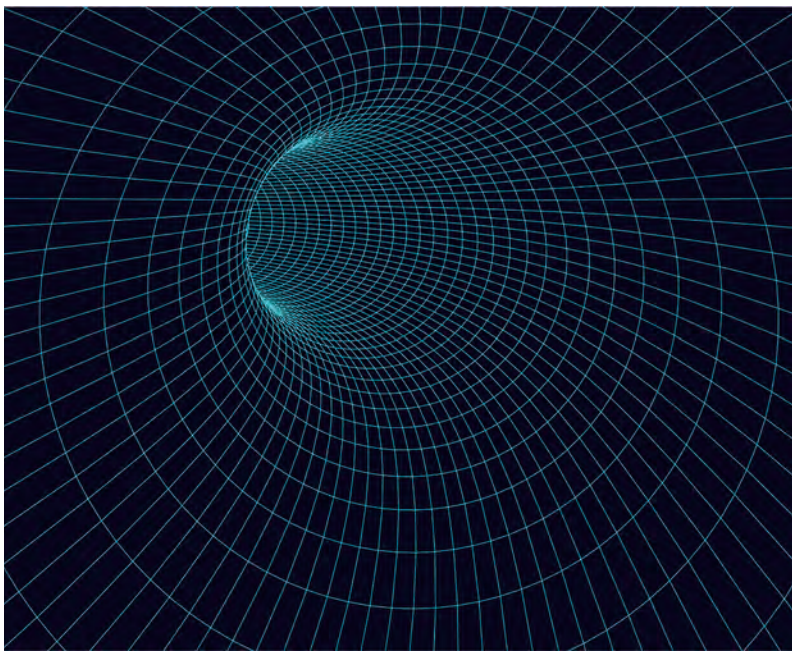
says truths about nature have to be understandable by the human brain. We have to live with the limitations of a brain that was built by Darwinian natural selection of hunter-gath-



erer ancestors on the African savanna, where medium-sized things such as antelopes and mates moved at medium speeds. It's actually remarkable that human brains—even if only a minority of them—are capable of doing modern physics at all. It is an open question whether there remain deep truths about the universe that human brains not only don't yet understand but can never understand. I find that open question immensely exciting, whatever the answer to it may be.

Theologians love their "Mysteries," such as the "Mystery of the Trinity" (how can God be both three and one at the same time?) and the "Mystery of transubstantiation" (how can the contents of a chalice be simultaneously wine and blood?). When challenged to defend such stuff, they may retort that scientists too have their mysteries. Quantum theory is mysterious to the point of being downright perverse. What's the difference? I'll tell you the difference, and it's a big one. Quantum theory is validated by predictions fulfilled to so many decimal places that it's been compared to predicting the width

of North America to within one hairsbreadth. Theological theories make no predictions at all, let alone testable ones.

Of course, not all the sciences can boast the formidable accuracy of physics. We biologists stand in awe of the LIGO experiments in which gravitational waves, having traveled a billion light-years, are detected by measurements accurate to less than a thousandth the width of a proton. Biological experimenters have to confront problems such as subjective bias of the experimenter—"intuitive ways of knowing." Medical scientists have perfected safeguards aimed precisely against intuitive ways of knowing, because these are highly likely to mislead. The double-blind control test has become the gold standard for demonstrating the efficacy of a medical treatment. A new drug must be compared with a placebo control, and the comparison tested statistically. Neither the patients, nor the doctors running the tests, nor the nurses administering the doses, nor the analysts evaluating the results are allowed to know which patients were given the placebo and which the drug, until all the results are in. I myself conducted a double-blind test of dowsing (water divining). It was pathetically touching to witness the sincere distress of the professional dowsers when they failed—every single one of them—to perform above chance level. The poor things had never before been tested under double-blind conditions. They had never before been deprived of whatever subliminal cues normally inform their "subjective ways of knowing." I treasure

Science is also humble. We may know what we know, but we also know what we don't know.

the remark of a homeopathic doctor who, when his methods failed under double-blind testing conditions, said, "You see. This is why we don't do double-blind tests any more. They never work!"

A layperson's version of the pernicious philosophy I mentioned earlier is the familiar bleat of, "Well it may not be true for you, but it is true for me." No. It's either true or it isn't. For both of us. As somebody once said (authorship multiply attributed), you are entitled to your own opinion but not to your own facts.

Some of what I have claimed here about scientific truth may come across as arrogant. So might my disparagement of certain schools of philosophy. Science really does know a lot about what is true, and we do have methods in place for finding out a lot more. We should not be reticent about that. But science is also humble. We may know what we know, but we also know what we don't know. Scientists love not knowing because they can go to work on it. The history of science's increasing knowledge, especially during the past four centuries, is a spectacular cascade of truths following one on the other. We may choose to call it a cumulative increase in the number of truths that we know. Or we can tip our hat to (a better class of) philosophers and talk of successive approximations toward yet-to-be-falsified provisional truths. Either way, science can properly claim to be the gold standard of truth. ■

Evolutionary biologist Richard Dawkins is the author of such books as *The Selfish Gene*, *Unweaving the Rainbow*, *The Magic of Reality*, *Science in the Soul*, *Outgrowing God*, and a memoir, *Brief Candle in the Dark*. He is a fellow of the Committee for Skeptical Inquiry and a board member of the Center for Inquiry. This article first appeared in the Christmas 2020 issue of *The Spectator* under a different title. At the author's request, we here restore his original title. It is published here by permission.

Author image courtesy of David Shankbone.

Behe, Bias, and Bears (Oh My!)

Another swing and a miss for intelligent design creationism.

NATHAN H. LENTS

After a series of stinging defeats in the U.S. courts, one branch of biblical creationism mutated into a neo-creationist movement known as intelligent design (ID) in the late 1980s. The selective pressure that led to this evolution was a single line in the 1987 *Edwards* decision by Supreme Court Justice William Brennan that emphasized differing views of human origins might be permissible in public schools if they were driven by "secular intent." This led some creationists to strip the religious language and present their ideas as purely scientific. No serious person was fooled by this game of rhetorical dress-up, least of all a George W. Bush–appointed federal judge who ruled that ID is not scientific and cannot be divorced from its religious motivations (Jones 2005). (For a history of the modern ID movement, see Barbara Forrest and Paul R. Gross's 2007 book, *Creationism's Trojan Horse: The Wedge of Intelligent Design*.)

Among the most obvious signs of the pseudoscientific nature of ID is the almost complete absence of relevantly qualified experts. Its leaders are mostly theologians, philosophers, and historians, along with some physicians, engineers, and mathematicians, but there are shockingly few scientists—and even fewer biologists—and almost none have research experience in evolutionary or molecular biology. This gives them no pause in attempting to challenge the entire scientific establishment, not through original research but through books and articles published on Evolution News, the most influential ID-supporting website. Although Evolution News presents itself as a science website, it frequently covers social issues such as abortion, religious freedom, gay marriage, euthanasia, and their favorite bogeyman: Marxism.

Another sign of the pseudoscientific nature of ID proponents is their confident assertions regarding the imminent ascendance of ID. Readers are assured that scientists are confused and desperate because the end is nigh for ideas such as the big bang and the whole of evolutionary theory. Claims such as, "Given a 'primal blueprint' that preceded the first life, the solution can only be intelligent design," are offered as scientific certainties even though scientists who actually study the origins of life see no such blueprint. Similarly, the past ten years have seen unprecedented discoveries that help illuminate our evolutionary past, yet, as Evolution News reports it, the discoveries of the 2010s "actually weakened the evidence for human evolution." Not a single active paleoanthropologist would agree.

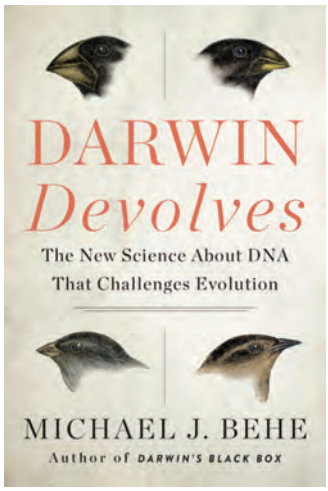
The Author

One of the very few legitimately credentialed molecular biologists who subscribes to ID is Lehigh University biochemist Michael Behe. While most ID material is unworthy of a response, Behe is a clear and engaging writer with particular command of the molecular details of life. He is neither a rube nor a neophyte and writes with a polished veneer of scientific authority. In his 1996 book *Darwin's Black*

Michael Behe. Courtesy of the Lehigh University Biological Sciences website.

Box, Behe asserts that many biological structures harbor the property of *irreducible complexity*, being so intricately complex with multiple interconnected parts that they could not possibly have evolved piecemeal, because the overall structure has no function until all parts are in place. To be sure, the challenge that irreducible complexity posed to the field of molecular evolution was rhetorical, not scientific, but it did draw attention to these important questions and inspired scientists to more fully flesh out the theoretical framework for how some complex molecular structures evolve and to better explain this framework to the public. For that reason, *Darwin's Black Box* could be charitably seen as a contribution to science.

Every single one of Behe's examples of irreducibly complex molecules and structures has since been thoroughly debunked by scientists. Russell Doolittle taught us how the blood clotting cascade likely evolved, with no reliance on incredibly unlikely steps (Doolittle et al. 2008). The bacterial flagellum evolved from the type III secretion machinery (Miller 2004). The vertebrate eye, and its stunningly similar counterpart in cephalopods, evolved in discrete steps of *increasing*, not irreducible, complexity (Lamb et al. 2008). Yet Behe continues to trumpet these examples and declares them "unchallenged."



The Thesis

Recently, I reviewed Behe's latest book, *Darwin Devolves*, for *Science*, the top scientific research journal in the United States (Lents et al. 2019). Behe argues that unguided random mutations serve primarily to damage genes and that doing so is occasionally good for the organism, leading to adaptation through natural selection of these damaging-but-advantageous mutations. Thus, Behe accepts that microevolution through random mutation can diversify organisms into species and genera—and perhaps families—but that something more is needed for large-scale evolutionary transitions.

Behe accepts the true age of the earth and admits that the evidence for the common ancestry of all life, including humans, is overwhelming. He sees a gap in evolutionary theory, however, in explaining the emergence of new kinds of organisms and concludes that it must require the intervention of the designer in some way. He stops short of providing evidence for the intervention and instead presents ID as the default position left standing after he shows how the unguided forces of evolution are insufficient for accounting for the origins and diversity of life.

But Behe does not show that. *Darwin Devolves* is mostly dedicated to explaining, often in great detail, how some high-profile examples of evolutionary research actually favor *his* view, rather than the interpretation of the scientists who did the work. As I will show, his discussion of every single example is misleading, sometimes egregiously so, insofar as he exaggerates the evidence that supports his view and ignores or dismisses the evidence that doesn't. But even more damning is his near-complete omission of any discussion of the molecular and evolutionary forces that are responsible for the very phenomena he focuses on.

The Omissions

If Behe seeks to support his claim that standard evolutionary forces are insufficient to generate adaptive innovations, one would think he would dedicate quite a bit of time to discussing those forces and why scientists are wrong about them. Instead, he takes the opposite approach and either summarily dismisses them or ignores them altogether. For example, one molecular mechanism that has driven otherwise incredibly improbable evolutionary events is horizontal gene transfer, when genetic material moves from one species to another, usually through a virus (Keeling and Palmer 2008). This phenomenon is most famous for the origin of mitochondria and chloroplasts, foundational events in the evolution of complex cells, but it has been shown to occur in more mundane instances as well. For example, deer ticks gained new defenses against bacteria through genes that came from the bacteria themselves (Chou et al. 2015). While certainly not a common occurrence, horizontal gene transfer can, in one momentous instant, have profound effects in the evolutionary potential of a lineage. Despite its importance in the very concepts that Behe tackles, he does not mention this concept even once in *Darwin Devolves*.

Also unmentioned by Behe is exaptation, the co-opting of a structure, be it a molecule or anatomy, for a new function. For example, two of the three bones of the mammalian middle ear were co-opted from jaw bones in our reptilian ancestors. Wings, feathers, and swim bladders are other well-worn anatomical examples, but exaptation is even more prolific at the molecular scale. With the subtlest of tweaks, enzymes can catalyze different reactions, genes can be expressed in different tissues, and proteins can find new binding partners. Though Behe does not bother to address this, the molecular possibilities of exaptation are endless, particularly when gene duplication is involved. In the age of genomics, the evidence

for molecular exaptation is abundant.

Speaking of gene duplication, Behe barely mentions this phenomenon either, despite it being a common first step in evolutionary innovation and diversification. When a gene has an essential function, it is tightly constrained by natural selection, and almost any mutation would cause harm and be eliminated. When a gene has been duplicated, however, the original copy can retain essential functions while the randomness of mutation and recombination fiddle around with the new one. In a powerful 2012 article, completely unmentioned by Behe, Dan Andersson and colleagues showed that gene duplication—through random mutations—can lead bacterial cells to evolve the ability to synthesize an amino acid that they were previously unable to (Näsvall et al. 2012). What Behe claims evolution can't do, scientists have already shown it can.

Behe barely mentions gene duplication despite it being a common first step in evolutionary innovation and diversification.

Behe fails to discuss genetic recombination as well. It is beyond frustrating that Behe claims that evolution has no means to generate adaptive innovations when not only do such mechanisms exist but there is a rich literature of research on them that he simply ignores. This is part of a larger pattern by ID proponents, and Behe in particular, of ignoring the very evolutionary mechanisms that they claim do not exist. Furthermore, *Darwin Devolves*, like Behe's previous two books, frequently discusses evolution and natural selection as though they are synonymous or as though natural selection is the sole engine of evolution. But natural selection is but one evolutionary force, albeit the most famous one. Mutation, genetic drift, sexual selection, recombination, horizontal gene transfer, frequency-dependent selection, and neutral theory all contribute to the toolkit of evolution. When Behe claims that natural selection alone cannot account for the rich molecular biodiversity we observe, he's absolutely correct. Rather than looking to the designer, he should look to some of the discoveries we've made in the past 160 years (Darwin 1859).

The Misinterpretations

To support his view, Behe focuses his attention on several of the most high-profile examples of evolution research and attempts to reinterpret them. For example, he spends nearly an entire chapter explaining how the long-term *E. coli* evolution experiment (LTEE) shows how mutation and natural selection serve only to "break or blunt genes." Richard Lenski, the architect of the LTEE for thirty years and 70,000 bacterial generations, has responded to Behe at length in a series of blog posts (Lenski 2019). It is hard to overstate just how badly Behe misinterprets the LTEE, including the fact that the controlled environment is highly artificial *on purpose*. There is unlimited food, static temperature, and high oxygen, and there are no competitors, pathogens, or immune system to challenge them. It is essentially an endless race at breakneck speed with strong competitive advantage for streamlining, efficiency, and growth acceleration. The LTEE was designed to detect the molecular mechanisms of evolution and has succeeded in spectacular detail, earning Lenski membership in the National Academy of Sciences (Good et al. 2017).

Behe is correct that the bacteria have adapted to this peculiar environment by ditching basically anything that slows them down, especially genes that aren't useful in this setting. He fails to mention that plenty of gene products show enhanced function as well. Further, some of the bacteria even developed the ability to eat citrate, which is included in the growth broth to assist the absorption of iron, not as a food source (Blount et al. 2012). Behe begrudgingly admits this but dismisses it as a "sideshow" and declines to explain to his readers that the bacteria achieved this feat by reactivating a nonfunctional gene through an elaborate genomic rearrangement. Yes, this was a very improbable event, but that is exactly the point. Behe's whole thesis is that the odds of getting new functions from unguided mutations are so low that they just don't happen. But the LTEE proves they do.

Behe's whole thesis is that the odds of getting new functions from unguided mutations are so low that they just don't happen. But the long-term *E. coli* evolution experiment proves they do.

Behe also takes aim at Darwin's finches. He describes the remarkable work that Rosemary and Peter Grant have done on these famous birds, especially in regard to their genomes before and after a drought that briefly but significantly reduced their numbers (Grant and Grant 1993). But Behe uses the opportunity to scoff at the diversification of the finches in the first place, which took place when ancestors from the mainland found themselves stranded on the island two million years ago; their descendants have since adapted to the local habitats. He is unimpressed with their diversification into as many as eighteen species across five genera, adapting to a wide variety of foods, including mature leaves, a resource that no other bird species is known to subside on (Grant 1981).

Bizarrely, Behe compares the diversification of the finches on the Galapagos to the adaptive radiation of animals during the Cambrian explosion, more than 500 million years ago, complaining that the finches didn't evolve "at least one crummy new phylum, class, or order." Besides occurring over a much longer period of time and in smaller, simpler, and faster

reproducing animals, the Cambrian explosion was a global diversification event that occurred when the animal kingdom was just getting started. Dry land hadn't even been fully colonized by life yet, and new niches were opening up all over the planet. In contrast, most of the niches that Behe is surprised that the finches didn't adapt to were already occupied when they got there. That Behe fails to grasp this reveals a poor understanding of not just ecology but evolutionary theory itself—the idea he has spent the past three decades critiquing.

The Misunderstandings

The opening section of *Darwin Devolves* on the evolution of polar bears may be the most erroneous example in the book. Scientists recently sequenced the full genomes of polar bears and their closest relatives, brown bears, and were able to approximate the common ancestral genome using pandas as a reference (Liu et al. 2014). Because polar bears are a relatively young species—just several hundred thousand years old—the genetic differences between them and their close cousins are relatively modest and easy to scrutinize. The scientists generated lists of polar bear genes that have undergone recent evolution. Not surprisingly, polar bears have undergone much more change than brown bears, who pretty much live in the same way that their ancestors did. As Behe sees it, the engine of polar bear evolution was the accumulation of mutations that break or diminish their genes.

The gene Behe discusses most is *APOB*, which codes for apolipoprotein B, the main protein responsible for clearing cholesterol from our blood following a high-fat meal. Behe declares this "the most strongly selected mutation" (it's actually the second-most, and he later acknowledged this error). *APOB* has several polar bear–specific differences and has undergone strong positive selection, implying that it is important to their survival and success. This makes sense because polar bears live mostly on seal meat, a diet that is very high in saturated fat and cholesterol, much higher than their brown bear cousins who eat leaves, berries, and sometimes fish. Yet, they do not suffer much from the heart disease that we know can often result from a high cholesterol diet. Presumably, polar bear *APOB* must be highly optimized for handling the high cholesterol burden.

Somehow, Behe draws the opposite conclusion. This is puzzling because he notes that humans and mice with mutations that diminish the function of *APOB* are more prone to suffer heart disease. But polar bears do *not* get cholesterol-driven heart disease, so the logical inference to draw from these data is that polar bear *APOB* is *enhanced*, not diminished, by the mutations.

This is where it becomes crystal clear that Behe is blinded by his bias. Although there is no reason to conclude that polar bear *APOB* has been diminished based on the data alone, because that is what Behe was *hoping* to see, he did. In fact, he even seems to believe that the authors of the paper agree, claiming that "they determined that the mutations were very likely to be damaging." Having read the paper from title to references, I can confidently say that the authors determined no such thing. In fact, sentences such as "adaptive changes in *APOB* … contribut[e] to the effective clearance of cholesterol from the blood" clearly imply that they believe that polar bear *APOB* is better at its job, not worse (Liu et al. 2014).

Let's look at these mutations. First, they are not evenly distributed throughout the protein. More than half the polar bear–specific changes are in a small region called the *N-terminal domain*, which comprises just 22 percent of the protein. As the authors state, "This domain encodes the surface region and contains the majority of functional domains for lipid transport." Proteins can be damaged by mutations virtually anywhere. Enhancing mutations, however, must usually be placed precisely in the domain that performs the enhanced function. Thus, the location of the *APOB* mutations provides more support that enhancement, not diminishment, has occurred.

Behe's reading of the polar bear research seems to begin and end with the PolyPhen predictions. This is problematic for several reasons.

The evidence on which Behe bases his claim that polar bear *APOB* has been damaged comes from his reading of the authors' presentation of predictions made by a computer program called PolyPhen-2. This program can predict whether a given mutation diminishes the function of a protein based on how closely it corresponds to human genetic variation that is known to cause pathology. The PolyPhen tool was designed to identify disease-causing mutations in genomic data collected from human patients, a very different purpose than Behe's. Trained with large data sets of human genomic variation, the program predicts whether a given mutation alters the structure of a protein and, if so, labels these possibly or probably damaging. Mutations that likely cause little or no structural change in the protein, PolyPhen calls "benign."

On the other hand, the program has no way to predict enhancing mutations. That would require that it somehow knows all the functions of every protein and how those functions are carried out. There is no database of *enhancing* genetic variation in humans or any other species. Behe and others at Evolution News seem not to know this. They repeatedly insist that the program does not list any "constructive mutations" in polar bears, which is not even a possible output of the program! Importantly, what PolyPhen calls damaging (simply because the structure has been altered) could actually be a new or enhanced function, a point not lost on the study authors. In an interview with *New Scientist*, one of them repeated their conclusion that polar bear *APOB* likely makes cholesterol clearance "more efficient" (Coghlan 2014).

Behe's reading of the polar bear research seems to begin and end with the PolyPhen predictions. This is problematic for several reasons. First, whereas damaging mutations might *occur* more commonly than enhancing ones, the vast majority

Table S7: Liu, et al. Cell 2014.

Circled are parts that Behe omitted

Gene	Protein position	Ancestral AA	Polar bear AA	HDivPred	HDivProb	HVarPred	HVarProb
ABCC6	655	Q	H	probably damaging	0.96	possibly damaging	0.547
AIM1	530	T	S	benign	0.03	benign	0.018
AIM1	632	I	S	benign	0.00	benign	0.003
AIM1	821	N	K	possibly damaging	0.65	benign	0.122
APOB	716	N	K	possibly damaging	0.80	benign	0.265
APOB	749	D	E	possibly damaging	0.94	possibly damaging	0.807
APOB	2623	D	N	probably damaging		probably damaging	0.989
APOB	3920	T	P	possibly damaging	0.48	benign	0.088
APOB	4418	L	H	probably damaging	0.99	probably damaging	0.915
ARID5B	457	N	K	benign	0.12	benign	0.02
ARID5B	775	H	Q	benign	0.00	benign	0.002
ARID5B	787	S	R	benign	0.41	benign	0.133
ARID5B	875	H	Q	probably damaging	0.99	possibly damaging	0.731
COL5A3	149	R	S	probably damaging	0.99	probably damaging	0.993
COL5A3	694	K	N	probably damaging	0.99	probably damaging	0.991
COL5A3	963	P	T	benign	0.26	benign	0.249
COL5A3	1117	D	E	possibly damaging	0.95	possibly damaging	0.804
CUL7	508	D	N	possibly damaging	0.73	benign	0.159
CUL7	709	D	E	benign	0.00	benign	0.007
CUL7	1477	N	K	probably damaging		probably damaging	0.999
EHD3	269	K	N	benign	0.25	benign	0.197
IPO4	362	R	W	probably damaging	0.97	benign	0.339
LAMC3	791	D	E	probably damaging	0.99	probably damaging	0.971
LYST	1046	D	Y	possibly damaging	0.94	benign	0.272
LYST	1084	A	S	benign	0.04	benign	0.015
LYST	1140	F	L	benign	0	benign	0
LYST	1770	L	F	benign	0.00	benign	0.007
LYST	2672	N	K	benign	0.03	benign	0.021

Figure S7 from Liu et al. 2014, which lists the mutations that have been most strongly selected during polar bear evolution (we are displaying only the top half for readability). Circled in red are lines and columns Behe removed to create a chart he presented to defend his conclusions, which makes it seriously misleading.

of them don't *persist*. When studying speciation, the observed mutations have already been scrutinized by natural selection. We therefore expect an enrichment of those rare mutations that PolyPhen calls damaging but are actually constructive, as seems likely to have happened here. In fact, it's possible that *none* of the most strongly selected mutations are damaging. Second, other kinds of empirical data are more reliable than PolyPhen predictions, given that this is not the task the tool was designed to perform. Everything else we know about *APOB* points to the conclusion that the polar bear version must be well optimized.

My colleagues at Peaceful Science and I decided to look even more closely at the polar bear mutations in *APOB*. In a series of four discussion forums with nearly 100 contributions, eight molecular biologists pored over the data from the polar bear genome, as well as DNA sequencing data available in the NCBI database, and we scrutinized the PolyPhen-2 predictions ourselves, the kind of due diligence that Behe would have been wise to do (Swamidass 2021). We found that the picture is even murkier than it already appears. For one thing, if you substitute the human *APOB* protein sequence for the ancestor bear sequence as the reference in PolyPhen, only three of the nine polar bear variants are predicted to be possibly or probably damaging. (Using the human sequence as a reference is particularly useful because data from human disease-causing gene variants is how PolyPhen is trained.)

Even worse, we found that *none* of the nine mutations under scrutiny are actually fixed in the polar bear population. Yes, they are common, but most polar bears do not have all these individual variants. While this fact does not help us understand whether the mutations are damaging or not, it does weaken any claim that *APOB* was crucial in polar bear evolution. And the final nail in the coffin for this reasoning is that polar bears are resistant to atherosclerosis *despite* very high levels of circulating cholesterol. It may be that the polar bear adaptation to a high-fat diet has little to do with *APOB* whatsoever. Although we are left with an unclear picture, there is simply no hard evidence that *APOB* is damaged, let alone that the damage was somehow adaptive. Rather than carefully and objectively examining all available evidence, Behe simply pounced on a chart with some computer predictions that he didn't fully understand.

The Misrepresentation

There is a very unfortunate coda to the polar bear story. After Arthur Hunt and I wrote a blog post rebutting Behe's

claims, he responded with an angry rant on Evolution News that was aimed, oddly, more at Jerry Coyne for sharing our post than at us for writing it (Behe 2019). He offered a mere two sentences of defense, posting a chart with "the relevant information" that supported "every actual undistorted claim" that he made. However, instead of presenting the actual chart from the article, he made a new chart, including only the PolyPhen predictions that support *his* version of polar bear evolution and removing those that argue against it.

It's hard to overstate just how misleading this version of the chart is. In the original polar bear article, the complete list of PolyPhen predictions is in Table S7, which includes forty-eight separate mutations and the results of two PolyPhen predictions based on different genetic datasets (Liu et al. 2014). In one of them, 25 percent of the mutations are predicted to be possibly or probably damaging. Behe chose to leave those data out, preferring instead to show results from the other column, which predicted that 52 percent of the mutations might be damaging. Because this still doesn't look like an "overwhelming tendency" of natural selection to damage genes, Behe took things further and removed *all* the mutations that were not predicted to be damaging—nearly half the data—to create a chart that gives the desired impression. (See accompanying figure.)

When I called out this sleight of hand on Twitter, Evolution News responded in characteristic "google swarm" fashion, publishing a whole series of articles attempting to rescue Behe's claims about polar bear evolution while insulting me and my colleagues. They even dedicated one whole article to the "fake scandal" about the doctored chart, offering two defenses. First, they claim he was merely "saving space," an odd concern for a web-only publication. Second, they claim that he was only providing the "relevant information," that is, the data that shows that many of the mutations are damaging. This, too, strains credulity. When one's entire argument is that the overwhelming trend of unguided evolution is toward the breaking or blunting of genes, one cannot deliberately obscure all contrary evidence and not expect others to cry foul. In this case, an honest and transparent presentation of the data indeed paints a very different picture from the one Behe wanted his readers to see. In the quest to be taken seriously, Evolution News is its own worst enemy.

Conclusion

Darwin Devolves is a case study in how proponents of intelligent design grasp at any evidence that they can interpret in a favorable way, while simultaneously ignoring massive amounts of opposing evidence. Although this strategy is standard fare for creationism, the age of genomics has brought nearly limitless information to our fingertips, making it easier than ever for those poorly trained in genomics to mine the data for nuggets of evidence for their claims. Of course, the wealth of data also provides the full context for debunking weak claims, as we have done with Behe's assertions about polar bears. The careful work of analyzing and interpreting huge genomic data sets takes a great deal of time, training, and repetition. The few scientists who work within the ID framework would be well served to take the time and do the training. But let them be warned: it will be very difficult to remain within the ID framework if they do. ■

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Is There a Philosophical Magisterium?

Some scholars are promoting the idea that philosophy studies questions that science cannot. An analysis of the scientific method finds otherwise.

CHARLES H. JONES

I was at an ethics lecture when the professor stated that philosophy studies what science does not. This was when I became aware of the philosophical version of Stephen Jay Gould's concept of nonoverlapping magisteria (Gould 1997). This was a little surprising because the lecture was on the ethics of technology, but it was not as surprising as being introduced to Massimo Pigliucci's promotion of the philosophical magisterium at CSICon 2018 during his presentation on "The Variety of Scientisms and the Limits of Science." Is it true that there are questions the scientific method cannot address?

The scientific method studies objective physical reality. It uses reason and evidence (logic and measurement) to do so. We can only experience the physical world. Anything physical can be measured. Logic can be applied to any measurement. This is a logical refutation of a philosophical magisterium. But people keep presenting questions they claim cannot be analyzed via the scientific method, so it behooves us to engage in deeper discussion.

To review and illustrate the scientific method, consider plumbing. Hypothesis: changing a washer fixes a leak. Experimental design and execution: change the washer. Data collection method: put hand under faucet. Analysis method: check if hand is wet. Peer review is conducted by the customer. Because plumbing can be mapped onto the scientific method, it is difficult to understand why Pigliucci thinks it is not science. Perhaps the confusion is that it is practical science rather than theoretical science aimed at advancing human knowledge. Perhaps another confusion is that practical science is not formal science (and we sometimes say that science was not done prior to science's formalization in the 1600s). But a magisterial discussion is about foundations, not formalizations. Smashing particles into each other is an advanced version of a baby pressing against something to test resistance. Instead of denying plumbing is science, perhaps Pigliucci could use it to illustrate that the scientific method is not mysterious.

A magisterial discussion is also about "in theory" rather than "in practice." The difference is illustrated by Bertrand Russell's teapot (Russell 1952). In theory, we could scour space for its existence, but it is neither practical nor of value to do so. A variant of "in practice" is "state-of-the-art." Science will never analyze every question, but that doesn't mean the scientific method is incapable of analyzing any specific question.

Pigliucci inferred, as others have, that science isn't really done using the scientific method because scientists do not perform the scientific method on a daily basis. This ignores the exploratory and preparatory parts of science. Exploring possible hypotheses and formalizing them is possibly the most time consuming part of science. Developing instrumentation can take a lot of effort. Formal hypothesis testing is only part of the scientific method.

Science assumes an objective reality—that something ex-

ists other than, and independent of, you. The other option is to assume solipsism, which ends the conversation because it takes two to have a conversation. We all see the same moon. A quantum system still exists when it's in an unmeasured quantum state. If we are a simulation, there is still a simulator (Moskowitz 2016).

Because we only observe reality through our senses (possibly technologically enhanced), every individual develops a subjective model—a *representation*—of reality.[1] Groups develop models of reality, such as the body of knowledge produced by the scientific method, through consensus. Neither of these models is reality itself, nor do they represent reality perfectly.

The distinction between objective reality and models of reality is a key concept that is illustrated beautifully by René Magritte's *La Trahison des image* (*The Treachery of Images*). It is not a pipe. It is an *image* of a pipe. Subjective models are the reason for confirmation bias. The scientific method's objective is to refine the models to be as close to objective realty as possible. Einstein's model is more refined than Newton's.

Nothing nonphysical affects the physical world. Anything that affects the physical world must do so in a measurable way, even if it is just to nudge an electron. In a sense, we do not measure magnetism; we measure its effect on electrons. This is what is meant by a physical force. Assume God talks to me and I tell people about it. Because speaking is a physical act, somewhere along the way to my larynx, God must have made a physical change in my body. In that case, by definition, God would be a physical force. If there is something outside our physical reality, there is *zero* possibility of knowing anything about it. Thus, it is true that questions about nonphysical things cannot be analyzed by the scientific method—or any other methodology. To discuss such questions is purely entertainment. (Although such questions can be analyzed by science to understand the people asking those questions.)

It is true that questions about nonphysical things cannot be analyzed by the scientific method—or any other methodology.

Science is dependent on measurability. When I say "metrology" (the science of measurement), most people think "meteorology." Few people know the formal definition of "a measure." The point is that few people are experts in measurement. Beauty is traditionally thought to be unmeasurable. Yet Netflix's and Amazon's recommendation algorithms predictively measure a form of beauty in the eye of each beholder. (When you rate a movie 4 out of 5 stars, you're saying it is 4/5ths beautiful.) Consciousness is also usually considered unmeasurable. Yet Zap and Zip (Koch 2017) is a first stab at measuring it. Any aspect of physical reality is measurable. As such, any statement about physical reality is testable.

Science depends on precise definitions. An example of the importance of this is God. Because God is so ill-defined, it appears impossible to disprove its existence. However, there are plenty of characteristics that have been used to define God. These have been used to disprove the existence of many types of gods (Martin and Monnier 2003). For example, if being merciful excludes condoning torture, God cannot be merciful and at the same time condone it. Any noun or verb must have physical characteristics to be meaningful. (Though imaginary, unicorns invoke a physical image.) Similarly, meaningful abstract concepts are abstracted from instances of physical reality. Otherwise, terms and phrases are no more than vibrations in the air or ink on paper. In practice, there are meaningful terms that don't lead to testability because they are only partially defined with physical characteristics. Part of exploratory science is to refine such terms to testability.

Ideally, experiments are repeatable. When I kick the universe in the same way, it kicks back in the same way—and experiments should not contradict each other. This is based on the assumption (for which there is much evidence) that objective reality is consistent. (Even believers in magic tend to assume casting the same spell produces the same result.) However, the scientific method acknowledges human imperfection. When experiments contradict each other, science requires reevaluation and the development of new experiments. It is self-correcting.

When experiments contradict each other, science requires reevaluation and the development of new experiments—it is self-correcting.

In providing a list of questions that he thinks cannot be analyzed by science, Pigliucci (2018) engages in a state-of-the-art fallacy (a form of argument from ignorance). Just because science *has not* analyzed a question does not mean it *cannot*. This is a common tactic of proponents of the religious magisterium and apparently of the philosophical version as well. This tactic is also a game of Whac-a-Mole. Well, here are a few whacks.

Contrary to popular belief, social sciences are, in essence, *physical* sciences, because they measure functions of physical brains. They predictably measure individual and group preferences in ways similar to recommendation algorithms. The Reproducibility Project (Open Science Collaboration 2015) evidences social sciences' use of peer review, self-correction, and reproducibility. People bemoan that these sciences do not make "precise" measurements; their results are just statistical distributions. Well, different people answer questions of the type "From 1 to 10" differently, demonstrating that distributions are the proper presentation of the results. Besides, the physical sciences are also based on statistical distributions. A fundamental principle of metrology is that every measurement includes an error. We cannot state that "a ruler is a foot long." The best we can state is that "a ruler is a foot long

plus or minus an error." The uncertainty principle formalizes this for simultaneous measurement of position and velocity. A celebrity example is the existence of the Higgs boson. Nobody has a Higgs boson in their hands. The conclusion is a statistical inference from complex measurements, every one of which has a margin of error (Yirka 2012). The difference between the two types of science is that the "soft" sciences are much harder than the "hard" sciences. We've discovered the Higgs boson but haven't solved world hunger.

Pigliucci (2018) asks, "Is *modus ponens* valid?" The answer is: it's your choice. Although not usually called such, *modus ponens* is an axiom; it is *assumed* to be valid. It doesn't have to be, but logics without it tend not to be very useful. For example, I would be surprised if there is a proof of "1 +1 = 2" that doesn't use it, let alone something such as the theory of evolution. But useful axioms can also be treacherous. Consider the axiom of choice (AC), which, informally, states that given any collection of bins, each containing at least one object, it is possible to make a selection of exactly one object from each bin. At first glance this seems innocuous, yet it leads to the Banach-Tarski paradox (Banach and Tarski 1924). Informally, this paradox states that, given an object of a certain volume, it can be deconstructed into parts that can be reconstructed into two objects, each of which has the same volume as the original object—a physical (vs. logical) absurdity. Ultimately, mathematics, including *modus ponens*, is a tool. In what sense is a hammer "valid"?

Pigliucci (2018) also asks, "What is the ontological status of numbers?" Or, more prosaically, "Do numbers exist?" It is silly to imagine holding a one in your hand the way you do an apple. Being a concept, a one is a model. Being a thing, an apple is part of physical reality. To conflate models with reality is a category error. We can, however, point to "one apple" and "one other apple" and thus point to "two apples." This illustrates that numbers and arithmetic "exist" in the physical world through instantiation. We can also point to physical representations of numbers, including ink on paper and electrochemical constructs in brains, but those aren't actual numbers. In response to the classic question: the instantiations of mathematics are discovered; its representations (the models) are invented.

In providing a state-of-the-art argument about abortion, Pigliucci (2018) joins many others in claiming science cannot be applied to morality. Morality is a human concept about volitional acts and social interactions. Rocks, the universe, and amoebae don't contribute to this concept. Let us follow a common scientific method approach of first looking at specific examples when analyzing difficult questions. There is a great deal of evidence, such as large infrastructures and legal toxicant levels, that providing clean drinking water is considered good. The approach then asks if there are underlying principles. Among others, conveying the idea of clean water requires communication, which is inherently a cooperative action. Further, providing clean water requires cooperation to develop filtration and delivery systems. This leads to a hypothesis that cooperation is a fundamental principle of morality. The approach then asks if there is further evidence. A set of data to look at is the billions of years of experiments conducted by evolution—what are the successes and failures? More than one person (Shermer 2004; Tomasello 2018) has noted that the evolutionary growth of society—from individual to family to tribe, etc.—requires cooperation. Humans cannot survive as individuals. Even though he presents it as subservient to the selfish gene, Richard Dawkins (1976) provides much evidence that "Selection has favored genes that cooperate with others." Studies of the iterated prisoner's dilemma also support cooperation as good. (In contrast, using the single iteration version to evaluate human morality is inappropriate. We are social creatures with memory—there is always potential for a next iteration. Further, it is a self-fulfilling prophesy, because the conclusion depends on whether the objective is personal or group wealth.)

Morality is a human concept about volitional acts and social interactions.

Consider generalizing this. Assume you have a moral maxim. Where did this come from? Didn't it come from observations of physical reality? Wasn't it from experiments or people's thoughts or actions? Even hallucinogenic visions manifest in physical brains. In other words, wasn't exploratory science used? Now, call that maxim a hypothesis, and experiments can be devised to test it.

The science of morality is in its infancy. As with all fields of study, it will never analyze all questions. But when multiple lines of inquiry—both evidence- and logic-based—converge on a common conclusion, it starts looking like a scientific theory.

I assume philosophers are interested in using any gleaned wisdom to change people's actions (if only their own). Such actions, being physical, are in the scientific method magisterium. Suggesting that philosophical hypotheses are not informed by science ignores not only exploratory science but also the feedback of experiments to refine hypotheses. Using the phrase "clean water" is not good enough. If acceptable—measurable—levels of toxicants cannot be defined, then all water is "clean," and the phrase is meaningless.

Philosophy may not be dead as some people claim. But the philosophical magisterium is a nail in its coffin. Why should people be interested in something (other than for entertainment purposes) that does not affect physical reality? Philosophy, like morality, is about human concepts. The millennia of philosophical records are thus evidence that can be used, in the same way social surveys can be used, as a basis of exploratory science. Philosophy has played—and can potentially continue to play—this role. But philosophical consensus is not enough. Philosophers need to acknowledge that any epistemic statement must be supported by more than opinion. For example, the opinion (widely accepted for millennia) that women need to be controlled by men to curb their inherent sinfulness does not hold up against evidence.

This brings us to epistemologies. Assuming there are questions that science cannot analyze, what method does philosophy offer to analyze these questions? Pigliucci (2009) offers "logic or more broadly reason-based arguments." So, which logic should we use: to AC or not to AC? There are much subtler disconnects between reason-based arguments and reality than the result of the Banach-Tarski theorem. How do you identify them—especially in the presence of confirmation bias? The product of any epistemological investigation is a sequence of words presented as a statement about reality. But words are treacherous. This is why epistemologies must include testing statements against reality. Logics and their conclusions are tools. You don't choose a hammer because it is derived logically. You choose it because it reliably drives real nails into real wood.

It is absurd to suggest that science doesn't use logic or reason-based arguments (e.g., the first step in hypothesis testing is checking logical consistency), so the issue is strictly about using evidence. The problem with claiming that the use of evidence is not necessary is that it opens the door to ignoring evidence. Any statement about reality is testable because all aspects of reality are measurable. The only acceptable time for not using evidence is when it is unavailable due to practical limitations. Saying otherwise is saying that using evidence is a choice. Who gets to choose? People who claim that vaccines cause autism?

Pigliucci suggests we use logic and also asks if logic is valid. Besides being a little contradictory, the latter of these raises the specter of a common antiscience meme: science doesn't "prove" anything. Well, no other epistemological method does either. The difference from some epistemologies is that science acknowledges this. What the scientific method does is provide evidence that is consistent across time, space, and culture. This has led to an overwhelming demonstration of its usefulness—from plumbing to understanding evolution. Using science based on its usefulness is sometimes dismissed as just pragmatism. But why use an epistemology that isn't useful?

Some philosophers are embracing science. Why aren't all philosophers? Science is at the point where it can provide—and *is* providing—objective advances on philosophical questions. There are always practical and state-of-the-art limitations; any decision is based on limited knowledge and evidence. But why isn't there a form of rejoicing about progress being made on classic philosophical problems? Are philosophers more interested in hearing themselves talk than making measureable changes in the world? People will continue to apply science to philosophy regardless of proponents of a philosophical magisterium. Rather than claim that people cannot do what they are already doing, philosophers could help develop hypotheses and evaluate experimental methods and results.

The claim that some portion of philosophy is outside of science is not supported by analysis. Nothing nonphysical can be studied via the human body. Everything physical is measurable. Science can analyze anything measurable. Further, philosophical activities can be mapped onto part of the scientific process.

The methods used to support the philosophical magisterium are the same types of methods used to promote alternative medicine and pseudoscience: Whac-a-Mole arguments, claiming immeasurability, inaccurately characterizing science, ignoring the treachery of subjective models, and saying that using evidence is a choice (to name a few). These legitimize statements such as: "Science just can't explain [insert pet idea here]."The philosophical magisterium needs to be refuted not just because it is false but also because it supports the process by which people die from quackery. ■

Note

1. The modelist theory requires only three assumptions: *cogito, ergo sum*; something exists besides self (objective reality); and that sensory perceptions interpret, rather than capture, reality.

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Continuity, Not Magisterium—A Response to Jones

Science and philosophy exist on a continuum with areas of overlap and reciprocal aid. Each informs the other—or should.

MASSIMO PIGLIUCCI

Charles H. Jones does not like the idea that philosophy and science are separate magisteria, analogous to the sharp separation between religion and science once proposed by evolutionary biologist Stephen Jay Gould. Well, I agree with Jones: science and philosophy aren't separate magisteria, and I actually wrote critically of Gould's idea in the pages of Skeptical Inquirer (Pigliucci 1999).

Like many philosophers, I endorse instead a continuity model of the relationship between science and philosophy. In this model, there are both areas of overlap and reciprocal aid as well as areas about which one field is largely or completely silent about the other.

I find it interesting that Jones accuses me of both not understanding the scientific method *and* of indirectly aiding and abetting pseudoscience. I had been a practicing scientist for decades before shifting my academic interests and have written critically for many years about pseudoscience, including in the pages of this magazine. I think I can be afforded the courtesy of not impugning either my intelligence or my intentions.

That being said, Jones makes several points, some of which I find myself in complete agreement with and others of which I think he goes awry or simply misunderstands my take. For instance, we agree that both science and philosophy use a combination of logical reasoning and evidence. But so do all sorts of other activities, from plumbing (mentioned by Jones) to my daily navigating of the New York City subway (before COVID-19). If we take "reasoning," "evidence," "hypothesis," and "testing" in the most broad and informal understanding possible, then pretty much *all* we do is "science."

Not only that, but a lot of other animals apparently also do science, because their behavior can be reasonably described as testing hypotheses about reality on the basis of observations and (informal) experiments. But that won't do. If we define a concept—be it science, philosophy, reasoning, or whatever—in such broad terms that it encompasses by definition all possible instances, then that concept is *meaningless*.

As Helen Longino (2019) has cogently argued, science is a particular, historically and sociologically situated practice. It is a practice that is sufficiently distinct not only from philosophy and plumbing but even from logic and mathematics. It's to be recognizable and analyzable on its own terms. Try this out as an experiment: pick any paper in a technical philosophy journal, another from a journal in the natural sciences—say biology or physics—and a third from mathematics or logic. I challenge you to find much similarity in the way these papers are written, in their internal structure, in the subject matters

they treat, and in the way they are evaluated by the respective sets of peers. That ought to convince you that there are meaningful differences among these fields.

Jones makes much use of the alleged universality of the scientific method, which several philosophers over decades have suggested does not actually exist. Science isn't an algorithm that can be implemented in a computer, and it doesn't follow rigid rules. Paul Feyerabend (1975) argued that scientists are eminently pragmatic, that they'll simply use whatever works. He may have pushed his point too far when he talked about methodological anarchism, but the fact remains that science is rather characterized by something akin to what Thomas Kuhn (1962) called "disciplinary matrices." These are complex networks of observational and experimental practices, logical and mathematical tools, instrumental apparatuses, general theories and specific hypotheses, textbooks to train the new generation of students, systems of peer review, conferences, publications, granting agencies, and academic structures. All much more complex and fuzzy than the skeletal elements put forth by Jones.

Jones makes much use of the alleged universality of the scientific method, which several philosophers over decades have suggested does not actually exist.

Jones also makes bold metaphysical pronouncements that make me wonder how he thinks they can be defended on scientific grounds. For instance, I would agree with him that we live in a physical universe governed by cause and effect. That position, in philosophy, is called physicalism (Stoljar 2015). It's a reasonable assumption, but it cannot be proven or disproven by observation or experiment. And, contra Jones, solipsism is not the only possible alternative on the table. Moreover, of which physicalism is Jones talking about? Supervenience-based? Realization physicalism? Token physicalism? Reductive physicalism? Emergent physicalism? How would he discriminate empirically among these options?

I most certainly agree with Jones that science is in the business of producing models of reality and that Einstein's model is better than Newton's. But I wonder which theory of truth is Jones deploying here: the correspondence theory, the coherence theory, a pragmatic theory, or something else (Glanzberg 2018)? And, again, what experiments would he suggest to discriminate among these possibilities?

When Jones informs us that beauty can be measured, for instance by conducting a poll among Netflix viewers asking them which movies they prefer to watch, what conception of beauty is he referring to? Classical, idealist, hedonist, or what (Sartwell 2016)? And, at the cost of repeating myself, how would he discriminate among these by using the scientific method?

Jones tells us that the scientific method depends on precise definitions. Good luck with that, then. Setting aside that he hasn't provided us with a precise definition of science, philosophy, or anything else he is discussing, Wittgenstein (1953) pointed out long ago that most interesting and sufficiently complex concepts *do not admit* of precise definitions. Not because we don't understand such concepts well enough but because they are characterized by inherently fuzzy boundaries. As a fun game, the next time you are together with some friends ask them to arrive at a precise definition of the concept of a "game." It's impossible. For any finite set of necessary and sufficient conditions, you will find both games that are at least partial exceptions to the set or activities that are clearly not games and yet fit the conditions. The best we can do to teach people what counts as a game (or not) is to point and say "that is a game," "that is not a game," and, occasionally, "I'm not quite sure."

Jones claims that "meaningful" abstract concepts are abstracted from instances of physical reality. This is what the eighteenth-century philosopher David Hume proposed, which has been successfully challenged ever since. It is telling that Jones does not provide us with a single example of what he is talking about. Some meaningful concepts certainly are derived from observations of reality. "Unicorns" are an obvious extrapolation from horses and narwals. "Gold mountains" don't exist, but they can be conjured by associating the otherwise empirical concepts of "gold" and "mountain." But when we come to more and more abstract concepts—including much of what mathematicians and logicians deal with—the connection with the empirical becomes increasingly evanescent. That is why math and logic are *not* sciences, despite the obvious fact that they are eminently useful to the sciences.

We are told by Jones that the social sciences are *fundamentally* physical sciences, because, you know, they deal with physical things such as human beings. But they also deal with abstract concepts, such as "society," "democracy," "law," "justice," and so forth. In fact, the social sciences are a perfect example of a field that is partly scientific and partly humanistic. Measurable, quantitative facts about, say, the economy and demographics of societies are inextricably connected with qualitative and subjective representations of those same societies by the individuals who live in them (through their personal diaries, newspaper articles, biographies, and even works of fiction). Is there a sharp separation to be made here? No. Are there interesting and meaningful distinctions at play? Of course.

Similarly, I agree with Jones that the so-called "soft" sciences are distinct from the "hard" ones primarily by the fact that the job of psychologists, sociologists, and economists is much more difficult than that of physicists and chemists. This is because they deal with the most complex objects in the known universe: human brains and human societies, not merely quarks and electrons. But this does not help Jones's thesis at all, because it rather points toward yet another idea that has been developed in philosophy of science over the

past several decades: far from being a recognizable whole that includes everything, science itself is highly heterogeneous (Dupré 1995), with different disciplines (natural sciences, social sciences, experimental sciences, historical sciences) being marked by interesting distinctions that we need to keep in mind if we wish to understand how science actually works.

In response to one of my original examples, Jones says that the answer to the question of the validity of *modus ponens* in classical logic is "it depends." Indeed it does. But on what? On the system of logic one is adopting, which depends in turn on the sort of questions one is interested in. But only a fraction of such questions have to do with the empirical world; most of them are generated within the very field of logic itself. More important, the *answers* to questions in formal logic do not depend *at all* on observation or experiment. This means that there is an infinite number of truths that are entirely outside of science, as long as we understand the latter as having at least something to do with how the world is (as distinct from hypothetical or abstract inquiries).

To my question about the ontological status of numbers, Jones replies:

> It is silly to imagine holding a one in your hand the way you do an apple. Being a concept, a one is a model. Being a thing, an apple is part of physical reality. To conflate models with reality is a category error.

Indeed, but where did I commit such an error? When did I ever say that a possible answer to the issue of the ontology of mathematical constructs is "here, hold the number one in your hand"? Nevertheless, the ontological question is vexing, and it has divided not just the community of philosophers of mathematics but that of mathematicians, with various answers having been advanced: realism, structuralism, nominalism, and so forth (Horsten 2017).

Regarding morality, Jones reminds us that cooperation is likely an evolved, adapted human trait. Yes, and it certainly provides us with one of the basic building blocks of what we call ethics (De Waal 2009). But many ethical issues we deal with today do not admit of straightforward answers based on a naive version of evolutionary psychology, as the one advanced by Michael Shermer or Sam Harris. In this instance, my original question regarded the morality of abortion. I have proposed that of course there are empirical issues *informing* our views on abortion. For instance, if we arrived at the (philosophical, by way of argumentation) conclusion that abortion is permissible, say, up until the point at which the fetus begins to feel pain, then it is a scientific question (specifically, one pertinent to developmental neurobiology) of when that moment comes, approximately. But the argument that led us to the conclusion that abortion is (or is not) permissible according to criterion X or Y is not one grounded in the sort of empirical facts that biology, let alone physics, trades in.

Contra Jones, I have never suggested that philosophical arguments should not be informed by science. As I said at the onset, I see science and philosophy as sufficiently distinct but continuous enterprises, just like science and math or logic. Indeed, philosophy represents an interesting—and I would suggest vital—nexus connecting the natural sciences, the social sciences, the humanities, and logic. So *of course* philosophizing ought to be informed by the best science available, and those colleagues in philosophy who reject such a notion are relegating themselves to oblivion out of a misguided sense of pride in their discipline.

But scientists sometimes make the opposite mistake, that of colonizing other fields in the name of an elusive scientific method that allegedly can deal with everything of interest to human beings. Don't take my word for it; take the word of one of the most eminent scientists of all time instead:

> I fully agree with you about the significance and educational value of methodology as well as history and philosophy of science. So many people today—and even professional scientists—seem to me like somebody who has seen thousands of trees but has never seen a forest. A knowledge of the historic and philosophical background gives that kind of independence from prejudices of his generation from which most scientists are suffering. This independence created by philosophical insight is—in my opinion—the mark of distinction between a mere artisan or specialist and a real seeker after truth. (Einstein to Thornton, December 7, 1944) ■

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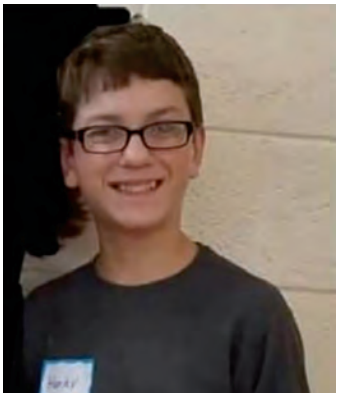
Psychic Detectives and the Tragedy of Harley Dilly

An Ohio boy's disappearance from a small town around Christmas 2019 was a genuine mystery. It eventually garnered the attention of national news media—and psychics.

BENJAMIN RADFORD



Harley Dilly

Investigations into the accuracy of psychic detectives in locating missing persons are typically conducted by skeptics after the fact. One benefit to examining psychic detective information is that it's often falsifiable (when and if the missing person is recovered). A Tarot reader or medium, by contrast, may give a client generic messages about how dead loved ones are looking out for them but rarely give specific information that can be validated. Predictions are rarely revisited and critically examined (by either clients or psychics), and in the rare cases they are, it's typically to cherry-pick and retrofit a few "hits" out of a sea of misses to inflate an accuracy rate.

I've researched many psychic detective cases over the years (e.g., Radford 2010), and in 2011, as a sort of investigational experiment, I followed a high-profile missing persons case as it happened. Holly Bobo, a young nursing student, had last been seen being led into the woods near her Tennessee home by a camouflaged individual. As the case unfolded, I gathered information not only on the investigation itself but also on visions provided by psychic sleuths about Bobo's whereabouts and circumstances. Several high-profile psychics, including Sylvia Browne and Carla Baron, offered information about Bobo, though—predictably—the psychic information did not lead to Bobo's recovery (Radford 2011).

Following a missing persons case contemporaneously has several benefits for an investigator, including the ability to document information both as revealed in press accounts and by psychic predictions; it also prevents the deleting or altering of incorrect information by psychics after the fact—that is, after details of the investigation have been borne out through police work or journalism. It is not hard to simply delete or retroactively tweak wrong information once the victim has been recovered, the circumstances are known, and a perpetrator has been identified. Missing persons cases are often literally a matter of life and death, and if there's any subject topic in which psychics could be practically useful and benefit victims, it's this.

Harley Dilly's Mysterious Disappearance

In early January 2020, I began to follow news reports of a fourteen-year-old boy named Harley Dilly of Port Clinton, Ohio, who was last seen a few days before Christmas 2019, on the morning of Friday, December 20. Harley left for school shortly after 6 a.m. but never arrived and didn't come home that night. His parents, Marcus and Heather, assumed he was out with his friends, as had been the case before. But when Harley hadn't returned by the next night, Marcus called the Port Clinton Police Department. An extensive investigation began on Monday. The public was asked to look for him: a white male wearing glasses with brown hair, weighing 100 pounds and about 4 foot 9 inches. His disappearance was especially concerning because he had attention deficit hyperactivity disorder and autism, though he was high functioning.

When asked about the delay in reporting his son missing, Marcus said Harley had previously gone from school to a friend's house overnight. Occasional family conflicts had led to Harley leaving the house and staying with friends, sometimes for a day or longer. He normally carried a cell phone but had recently broken it and was angry that his parents refused to replace it. Police questioned Harley's friends, one of whom described what Harley was wearing the last time he saw him: a maroon coat over gray sweatpants. Detective Ron Timmons said that they had obtained a surveillance camera image showing Harley crossing the street in front of his house at 6:08 that morning.

Because of the circumstances and Harley's disability, police soon called it a missing persons case. Parents, friends, and police shared alerts on social media and put up posters around the small town. After another week without success, the FBI was called in to help, and the story attracted national publicity, including on the A&E network and *Good Morning America*.

The fact that Harley hadn't been found yet led many people to assume he'd been kidnapped. After all, if he'd simply

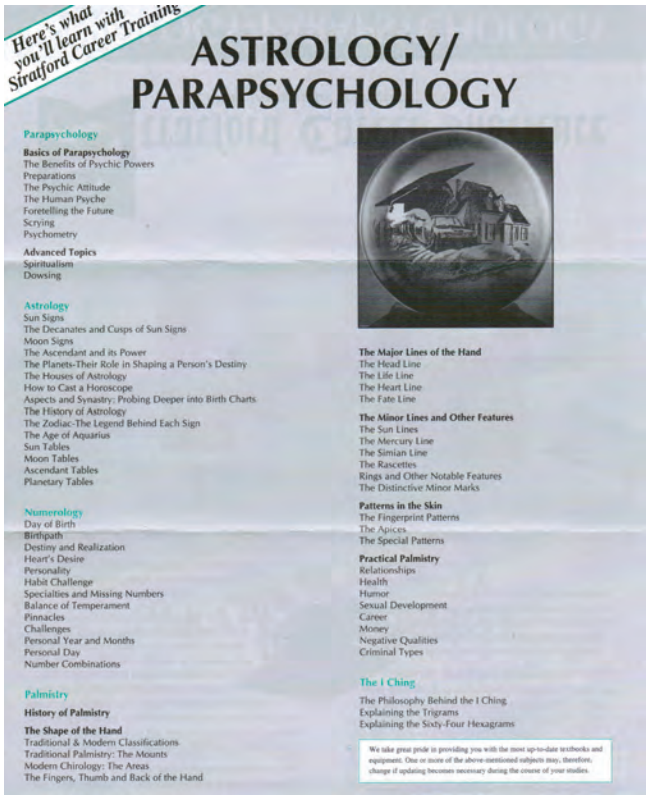


Figure 1. Stratford Career Institute coursework for Astrology/Parapsychology. From the author's files.

wandered away or been injured or killed in an accident, surely his body would have been found by that point. A fourteen-year-old boy on foot couldn't have gotten far alone, and in a small town he would have been noticed and recognized. Port Clinton has a population of about 6,000 people and covers an area of less than three square miles; it's on the shore of Lake Erie, and the nearest large city is Toledo, about forty-five miles away. An online poll in mid-January asked people following the case to offer their opinions about what happened to Harley. Out of the 185 people who responded, by far the most common assumption (nearly 75 percent) was that Harley had been abducted by someone he knew or an online predator. About equal numbers thought he had been killed in an accident, ran away, or committed suicide.

The search continued with tracking dogs, foot patrols, and helicopters. A $20,000 reward was offered for information leading to his return, but the money didn't help. No one was holding out for cash; there just were no leads at all. It seemed he'd simply vanished, and it was a genuine mystery.

Enter the Psychics

As the case drew national attention, the Port Clinton Police Department got tips from across the country. While rumors swirled and searches continued, several psychics offered information about the Dilly disappearance; the two most prominent were Jane Voneman Duperow (also known as Jane Voneman, Jane Voneman-DuPerow, and Psychic Jane) and Brian Ladd.

Jane Voneman Duperow

The author of several books and a YouTube series, Duperow describes herself on her website:

> I am one of the top psychic and Mediums in the U.S. because of my rare gift that no other psychic or medium has. … My clients are 100 percent satisfied. … I do Psychic readings and I listen to my spirit guides and higher power to help and guide you. I am clairvoyant, so I see visions, also I am clairaudiant, so I hear words or full sentences from your spirits on the other side. I channel your loved one's who have passed. My fees are $100 per private consult and I also offer phone readings. I accept cash or credit cards. I can also help find missing people or objects. (Duperow 2020)

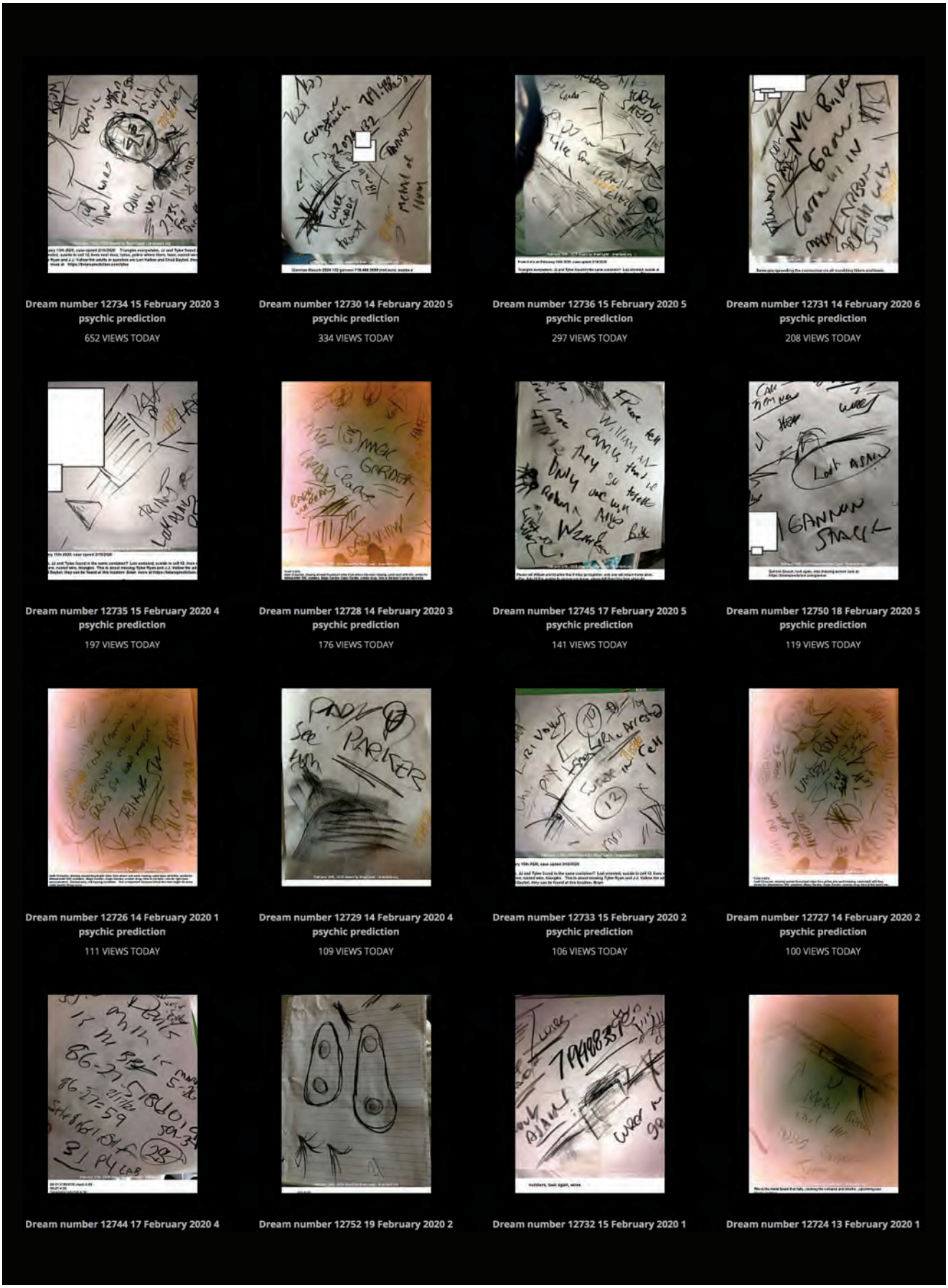
On her Facebook page biography, Duperow notes that she "studied Astrology/Parapsychology at Stratford Career Institute," graduating in 2005. Stratford is an unaccredited correspondence course school often described as a diploma mill. Stratford no longer offers the course, but I was able to find the curriculum in my files (see Figure 1).

Whether asked by concerned citizens to help search for Harley or prompted by a vision, Duperow posted this on her website on January 6:

> He was walking to school the day he went missing … I am writing this because I really want to help locate the boy with my intuitive abilities, so I am writing what I pick up in visions thus far: 1) Harley Dilly is on a couch gasping for air … 2) Grey Ford vehicle; 3) My spirit guides said he took a half day off the day before and left during his science class, or something having to do with science; 4) Vision of a possible perpetrator is a man with a go tee [*sic*] and facial hair, good looking man, around late 30s, middle forties, mustache also; 5) Another vehicle involved, a Lincoln Continental … he was put in this car, so he either went in this car willingly or was abducted.

In a second post, Duperow offered a much more extensive reading, condensed but verbatim here:

> I have read for thousands of people per year and most of my clients say I am very accurate and I have gifts to share to the world … I feel that something having to do with information from Harley's science class or what he did during half day around that class could help the police … I picked up another vision of a white office building kind of up on a hill. The office building looked like it had black windows so you could not see inside the building. Kind of like the windows that they sometimes put in medical buildings. The building was a big one and then I saw the numbers 101. I felt like this was an office room number. … He went with a man. I know this to be true because I saw a vision of a male when I meditated on it again. The man has a go tee and lot's of stubbles like he had not shaven. He was sort of good looking male and that is all I picked up on it as far as who Harley went with … I also saw a vision of some cement blocks of some kind. Like four of them in the ground. The kind that are usually near water. … I did see a vision of a boat, but I don't think he is in water, I feel that someone who goes fishing or knows boating though. This may also just be a vision of the search and rescue team … I heard that the Psychic male [Brian Ladd] who does the drawings and art work is pretty good and had solved one case so I am stating that he does pick up accurate information. I did not match up with anything that he said, but with both of our work together possibly something may add up, especially the red truck that


Dream number 12734 15 February 2020 3 psychic prediction
652 VIEWS TODAY
Dream number 12730 14 February 2020 5 psychic prediction
334 VIEWS TODAY
Dream number 12736 15 February 2020 5 psychic prediction
297 VIEWS TODAY
Dream number 12731 14 February 2020 6 psychic prediction
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Dream number 12735 15 February 2020 4 psychic prediction
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Dream number 12728 14 February 2020 3 psychic prediction
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Dream number 12726 14 February 2020 1 psychic prediction
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Dream number 12729 14 February 2020 4 psychic prediction
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Dream number 12733 15 February 2020 2 psychic prediction
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Dream number 12727 14 February 2020 2 psychic prediction
100 VIEWS TODAY
Dream number 12744 17 February 2020 4
Dream number 12752 19 February 2020 2
Dream number 12732 15 February 2020 1
Dream number 12724 13 February 2020 1

Figure 2. Art from Brian Ladd offering information about missing persons.

> people in the town of Port Clinton now focus on lo'ts. He also said some things about Walmart. … I did pick up the name Ramsey. … I pray that Harley is still alive and safe and will return home.

In sum, Duperow offers visions of a gray Ford; a red truck; a Lincoln Continental that Harley was driven away in; an attractive male abductor in his thirties or forties with a goatee and/or mustache and/or stubble; the name Ramsey; science or a school science class; the boy on a couch trying to breathe; a big white office building on a hill with darkened windows; the number 101, which might be an office number; four cement blocks in or on the ground, possibly near water; a boat; someone involved with boats or who fishes; and a Walmart. She also endorsed information provided by another psychic, Brian Ladd.

Brian Ladd

A biography posted to Brian Ladd's website states:

> Psychic Brian Ladd uses his visions, dreams to accurately predict future events. His online dream diary contains over 20,000 documented dreams, lucid dreams, and remote viewing cases. To date, over 3,000 dream predictions … have come true, with more and more every day. Brian has personally worked on hundreds of missing person cases since 2006 with a success rate of around 45%. Brian … was diagnosed with Schizoaffective Disorder in 2011, and some say this "illness" maybe the reason why so many of his dreams have come true. (Ladd 2020)

A January 13 post on his website noted, "Harley Dilly case, I will be posting new dreams every day at until Harley comes home to his family."

Unlike Duperow, Ladd uses sketches and scribbles to depict his stream-of-consciousness psychic visions, prophecies, and impressions. He photographs and posts them to his website, offering little explicit interpretation but inviting visitors to his website to study them for useful information.[1] Ladd sometimes writes brief captions to the images he posts and, in two cases, offered seemingly specific information about the missing boy: a December 30 post says, "Harley Dilly, under porch, Walmart, more numbers" along with a crude sketch of what seems to be a male face (it's not clear if it's supposed to represent Dilly, an abductor, or someone else); see Figure 2.

He also posted an image of a second person with the caption: "This is getting serious and I'm going to do some more work on this case tonight, will have a map location tomorrow and hopefully, this man's full name."The implication seems to be that the person Ladd drew is Harley's abductor or at least someone involved with the disappearance. No name seems to have emerged, but on January 11, Ladd posted an image titled "Harley Dilly search map," including a Google map image with two circles on it, an area near the lake: "Data from 5 dream sketches last night … this is the area that needs to be searched again … it's in Port Clinton Ohio"; see Figure 3. In one post, Ladd writes, "Harley Dilly found safe, this is the

Figure 3. A map from psychic Brian Ladd indicating—wrongly—where he thought Harley Dilly would be found

place, the same place!!! Harley Dilly located, numbers, cctv."

In sum, Ladd offers mostly ambiguous sketches and scrawls, but a few concrete, falsifiable claims emerge: that Harley Dilly had been abducted by a male; that the boy would be found (or had been) under a porch and would be located in or near the area Ladd indicated on a local map; that Harley or his abductor had some connection to Walmart; and perhaps most importantly (for the family and community) that the boy would be "found safe."

Harley Dilly Found

Harley Dilly's body was found nearly a month after his disappearance, on Monday, January 13. He was in the chimney of a vacant house across the street, only a few hundred feet away from his home.

Searchers had already looked around the house several times, but as the home—a private residence being remodeled—showed no sign of forced entry, there was no reason to enter it. All the windows and doors were locked, and police dogs didn't find Harley's scent near the entrances. It's not uncommon for later searches of previously screened areas to yield smaller, important clues. This is not due to investigative incompetence but instead how searches work: initial searches were for a teenage boy presumed to be lost or injured; searchers did not—and could not have legally—searched inside private homes (occupied or not) without probable cause and a search warrant. When exhaustive searches don't produce results, you conduct a deeper and more narrowly focused investigation to see what might have been missed.

When police entered the home, they found Harley's jacket and glasses next to a brick chimney and soon discovered his body stuck above. Police and the coroner determined that the death was an accident. Harley had been exploring the abandoned property and decided to climb on the roof, using an antenna tower next to the house as a ladder. Once at the top, he removed his glasses and jacket and tossed them down the chimney; they slid down to the floor and eventually alerted searchers to his body. He then climbed down the chimney—either for adventure or mischief—where he got stuck where it narrowed to nine by thirteen inches, and he suffocated to death (Chiu 2020).

Harley's parents were blamed by many on social media for having waited a day to call police. The time of death was difficult to determine, but it's likely that he died sometime on Friday, the same day he disappeared. He was probably dead even before anyone knew he was missing. Hindsight is 20/20, but calling the police sooner wouldn't have saved him.

Revisiting the Psychics

With the circumstances of Harley's death established, we can revisit the information and visions provided by Duperow and Ladd. It's clear that none of their information saved Harley's life or even helped anyone locate him after he died. Both Duperow and Ladd suggested that he was alive at the time of their readings and visions, but in fact he was dead long before they got involved.

All the information they gave was false: There was no abductor, no male with a goatee driving a Lincoln Continental, a gray Ford, or any other vehicle. Harley Dilly was not under a porch, or at a Walmart, or in the area Ladd had circled on a map. Nobody related to his disappearance was named Ramsey. There was no boat and no office building, with or without the number 101. The visions and predictions were wrong in every significant detail.

I interviewed Det. Ron Timmons of the Port Clinton Police Department, who was involved throughout the search for Harley Dilly. When asked about the role that psychic information played in the case, he replied:

> There were several psychic tips that we received. None of those tips led to the location of Mr. Dilly. Several were followed up on to the best of our abilities. Sometimes with the tips you can't follow up on it, when they say, you know, "it's close to the water" or something like that … or "it's in a field" and they can't give us any more information, so we couldn't check up on all of them. But the ones that we could, we checked up on to the best of our ability. None of them led to any further information in the case. (Timmons 2020)

I asked Timmons about Brian Ladd's Google map image describing where in the small town Harley would be found, and he confirmed that the department had seen it. "That was the wrong location. The location he showed was northwest, on the water compared to where the Dilly family lives, maybe five blocks south of the water, and it was maybe four of five blocks to the east of the location that he was describing." Chief Hickman monitored social media and filtered through many people contacting the police with "claims and messages received from Facebook that psychics said this or that, and he would send them out to the larger investigatory group as part of our tips."

Timmons emphasized that police don't want to discourage anyone from submitting tips, regardless of their origin, and that they were indeed followed up on, to the degree possible. In other words, it's not as if the police refused to consider or investigate information offered by psychics, and that's why Harley wasn't found sooner. Instead, the actionable infor-

This investigation was done as part of my podcast *Squaring the Strange*, with cohost Celestia Ward and guest Kenny Biddle each tackling other missing persons cases; for more, see "Testing Psychic Detectives in Real Time: Parts 1 and 2" (episodes 116 and 117), and Biddle's May 18, 2020, online column "Investigating Psychic Predictions in a Missing Persons Case" (at https://skepticalinquirer.org/exclusive/investigating-psychic-predictions-in-a-missing-persons-case/).

Figure 4. The house where Harley Dilly was eventually located

mation *was* taken seriously—as all plausible and potentially useful information must be, regardless of the source—and the information turned out to be fruitless and false. When the psychic information is specific enough to follow up on, it turns out to be wrong. When the psychic information is too vague, it's difficult or impossible to follow up on; the vague predictions were especially frustrating and useless. For example, as for the psychic vision that Harley would be found "near water," Timmons noted dryly, "We're on a peninsula, so, um …"

In the end, those submitting tips about Harley's disappearance were sincere and well-meaning:

> They thought it might have been a benefit to us, which ultimately was not true. It's like anything else, with the tips we received here. … We're getting [eyewitness and psychic] tips from all across the country that we have to follow up on. … When you look at the tips, the guy [described as possibly Harley] was six foot tall, and our Harley was four foot nine, things like that. They're all well-meaning people trying to help the investigation. (Timmons 2020)

After Harley was found, one skeptic replied on Jane Duperow's blog, "Oof wanna take another guess?," and Duperow did her best to salvage what she could of her reading: "I did see cement block as I said in the one paragraph" (Harley died in a brick chimney, not one made of cement blocks). She later added, quite remarkably, "Also I told the police he was in a house right around his neighborhood. I just forgot to list [it] in the blog."

Amid the sea of unhelpful and flat-out wrong information about Harley Dilly's disappearance, there's a single detail that could possibly be interpreted as having been at least partly validated. Duperow said that the boy was "on a couch gasping for air." This is of course factually wrong. Dilly was never on a couch gasping for air. But he was likely gasping for air in the tight chimney space where he suffocated. How impressive is this "gasping" detail (assuming we cherry-pick and blithely ignore the clearly wrong other half of this vision)? It might seem like a hit until we consider all the scenarios in which a missing person could plausibly be gasping for air. These include Harley being out of breath being chased by his abductor; being strangled or drowned; having an asthma attack; being choloroformed, gagged, or placed in a confined space; or any number of other scenarios. Had Duperow said the boy was "in a chimney gasping for air" or even "in a tight space gasping for air," it would have been far more impressive and useful.

In this tragic case—as in so many others—psychics failed when they were needed most, offering ambiguous, worthless, and simply false information to police and searchers. Most people would find it unethical to contact police with random hunches, ideas, visions, and "information" about missing persons, but people who believe they have intuitive or psychic powers feel an altruistic obligation to do so. Until and unless those visions are scientifically validated and proven, they do more harm than good. ■

Note

1. Brian Ladd's approach of offering art instead of words has two effects. On one hand, it is more ambiguous than information given by many psychics. This ambiguity offers a far wider latitude for interpretation and thus an increased likelihood of retrofitted "accuracy," because something in the pages and pages of shapes, numbers, scrawls, and so on could in theory later be seen as correct. A simple box shape could, for example, later be interpreted to be a field, house, barn, or other structure that a missing person was (eventually) found in, on, or near. Much of what Ladd produces is indecipherable scribbles and doodles, which police and searchers—even those who may believe in psychics—would rightfully dismiss as being incoherent and unhelpful. Hours spent trying to decipher what a line or symbol (or even a word) might mean are hours not spent on the ground searching for the lost boy. It also places the burden of interpretation on others, in the tradition of Nostradamus; the idea is that he's the psychic genius who's seeing divine truths and important revelations contained somewhere amid hundreds of scribbles and sketches—but he's too busy or important to sort out the wheat from the chaff and make sense of it. By Ladd's own admission, he's 45 percent accurate in his information locating missing persons. Taking him at his word, even if what he says is true—and it clearly is not—over half the time he's wrong.

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Fresh Thinking or Exploitation?

JANYCE L. BOYNTON

High school and college classrooms around the United States were offered a free virtual screening of the movie *Deej* for Disability Awareness Month in October 2020. The film was marketed as a Peabody Award–winning, Emmy-nominated film on autism, adoption, and inclusion that was excellent for the virtual classroom. This might seem like a great opportunity to learn about the struggles and triumphs of living with autism, but unfortunately *Deej*—along with *Autism Is a World* (2004), *A Mother's Courage: Talking Back to Autism* (2009), *Wretches and Jabberers* (2011), *Far from the Tree* (2017), and *The Reason I Jump* (2020)—is an uncritical promotion of a discredited technique called facilitated communication (FC).

Deej. 2017. 72 min. Directed by Robert Rooy. Executive Producers: Steven Ascher and Jeanne Jordan.

Unfortunately, *Deej* is an uncritical promotion of a discredited technique called facilitated communication.

Popularized by Douglas Biklen of Syracuse University and founder Rosemary Crossley of Australia, FC is marketed as a way to help people with severe communication difficulties tap into previously locked in language and literacy skills. To get FC to "work," a facilitator provides emotional and physical support, plus prompts and cuing, to help the person with disabilities type out letters on a letter board or communication device. However, dozens of controlled studies and eight systematic reviews reveal there is no empirical evidence that shows FC messages independently represent the thoughts of people with disabilities. Rather, facilitators—not the people with disabilities—inadvertently influence and control the typed messages. Most major health and advocacy organizations, including American Speech-Language-Hearing Association, International Society for Augmentative and Alternative Communication, and the American Association on Intellectual and Developmental Disabilities, accept the science and have position statements opposing FC's use.

Deej follows DJ Savarese, a young man with autism, through his final years of high school, as he visits prospective colleges, and into his first two years at Oberlin College. DJ's appearance on screen is tightly controlled. Despite claims that he has learned to read and write "freely," DJ demonstrates a limited ability to communicate independently. Most of the time, his adoptive mother accompanies him to facilitate. In one brief scene he uses sign language, but the people around DJ are not shown encouraging him to verbalize or use communication devices independently. He has the gross and fine motor skills to turn on a voice activation device by himself (after typing via facilitation), so it is difficult to understand why he needs anyone to hold his arm while he types.

The movie's editors chose to leave out some vital information. They show evidence-based methods for developing language, reading, and written language skills on the screen, but the viewer is led to believe DJ's ability to read suddenly "clicked" in the fourth grade. These unexpected literacy skills appeared to coincide with his introduction to FC in 2001. His adoptive father, Ralph, has written extensively about facilitated communication. During a college entrance interview, DJ is asked if he plans to type with his mom, an assistant, or by himself when he attends class. It's a fair question; colleges want to provide the necessary support to individuals with disabilities and, in the case of FC, know who is actually completing the coursework. The facilitated answer is that he will be typing independently, but scenes showing DJ in the classroom with a facilitator by his side 100 percent of the time do not back up this claim. Answers

to questions are pre-programmed, leaving open the possibility that the facilitator, not DJ, typed in the responses.

The movie's editors chose to leave out some vital information.

There is a disturbing animated scene through which DJ's childhood is discussed—one that alludes to neglect and abuse by his birth mother. Words attributed to DJ are spoken by the narrator: "I see scary people who want sex" and "I am very afraid." False allegations of abuse cases have plagued FC from its inception, and if these thoughts and feelings expressed in the documentary were facilitated (rather than expressed independently by DJ), then how much of the story is real and how much is fabricated by the facilitator?

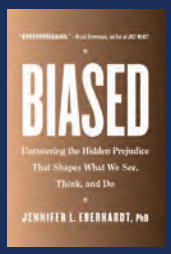
One sentence stands out in reference to DJ's adoptive mother: "No assistance device can do what she does." This, perhaps, says more than the producers of the film intended. It is obvious that DJ is surrounded by people who love him and want him to succeed. No one embodies this more than his mother, who quit her job and moved to Ohio to make sure her son has the 24/7 care that he needs. But as devoted and well-meaning as she is, his mother is most likely authoring the messages. She—not DJ—is doing the hard work of communicating. FC is built around trust and not questioning where the messages come from (that is, presuming competence). That FC "works" only with his mother is a convenient way to explain why FC doesn't work in other contexts, equivalent to psychics who claim to be able to "read" only those who already believe in their powers. FC supporters (or as his family is described in the movie, "fresh thinkers") view skeptics as being unfairly biased against FC and people with disabilities. This could not be further from the truth. Critics are concerned that the practice of FC is exploitative, because facilitators, knowingly or unknowingly, substitute their own voices for those of people with disabilities. Evidence-based communication methods and technology exist today that allow individuals to express themselves independently and without interference from a facilitator.

While *Deej* brings up valid issues of accessibility, independence, freedom of speech, and disability rights—as well as the need for care and support for people with disabilities and their families—it is a missed opportunity to teach people about what living with autism is really like. The story told in the documentary is one sided and built on facilitator-authored messages. A more honest look into DJ's life, not a projection of what people around him want him to be, would better honor him and others with disabilities in the promotion and acceptance of who they are as valuable members of society. ■

Janyce L. Boynton, MEd, BS, is an artist, educator, and former facilitator who advocates for evidence-based practices in the field of communication sciences and disorders.

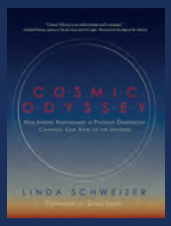
NEW AND NOTABLE]

Listing does not preclude future review. Written by Skeptical Inquirer *Editor Kendrick Frazier*

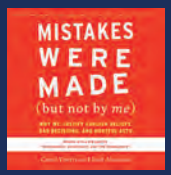


BIASED: Uncovering the Hidden Prejudice That Shapes What We See, Think, and Do. Jennifer L. Eberhardt, PhD. One of the world's leading experts in unconscious racial bias, Stanford psychology professor Eberhardt (she was also the subject of a 2018 SI article) shows us the many surprising places and ways that racial bias affects all sorts of decisions we make in the course of our lives—from the homes we buy, the people we hire, and the way we treat our neighbors. She probes the role of implicit bias in the criminal justice system and elsewhere and outlines successful approaches to new ways of thinking in understanding and changing our biases. Told in congenial first-person style that helps bring us along with her. Penguin Books, 2020, 348 pp., $18.95

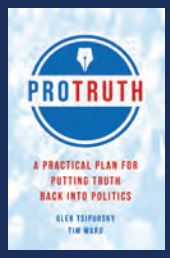
BIG—IF TRUE: ADVENTURES IN ODDITY. Benjamin Radford. A welcome collection of seventy of Ben Radford's Q&A Skeptical Inquiree columns from the *Skeptical Inquirer*. They demonstrate his patience, thoughtfulness, and thoroughness in sharing reliable information, informed analysis, and the skeptical viewpoint with curious readers. Organized into eight sections: Legends, Monsters, Ghosts, Mysterious Powers & Places, UFOs, Health and Medicine, Conspiracies, and Skepticism (examples of the latter: "Legitimizing Woo" and "Dealing with Believers"). Radford says he sees the book as "a kind of skepticism-tackles-the-weird" collection that didn't exist when he was growing up as a teenager and young adult. Now it does. Rhombus Publishing, 2020, 267 pp., $27.50.



COSMIC ODYSSEY: How Intrepid Astronomers at Palomar Observatory Changed Our View of the Universe. Linda Schweizer. Foreword by Dava Sobel. A PhD astronomer shares the iconic Mount Palomar Observatory's cumulative and rich contributions to science and how the discoveries happened and matured from theory to accepted paradigm. Individual chapters explore such topics as the universe's depths, Milky Way archaeology, galactic violence, quasars, galactic dust and gas, starbursts and supermassive black holes, the emergence of structure, the solar system, and astronomical exotica. Interestingly written and handsomely produced with many color photos and images. MIT Press, 2020, 312 pp., $39.95.

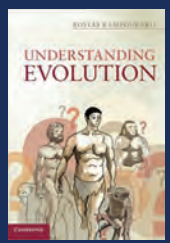


MISTAKES WERE MADE (but Not by Me), Third Edition: Why We Justify Foolish Belief, Bad Decisions, and Hurtful Acts. Carol Tavris and Elliot Aronson. The authors, both noted psychologists, present a new update of a near-classic work on cognitive dissonance and our self-justifying thinking, first published in 2007. The book's new 10,000-word final chapter, "Dissonance, Democracy, and the Demagogue," brings us into the chaotic world of the Trump administration. They say no application of dissonance theory is more important than understanding how his presidency further widened the chasms between political parties, friends, and families. "Americans will long be facing the moral, emotional, and political residue of his presidency," they write in the introduction. The final chapter examines in detail the process by which Trump and his administration fostered his view that opponents (or people who simply disagree with him) should be regarded "as treasonous, disloyal rats and foes"—and how supporters so easily bought into that view. It is an important and timely psychological examination of the Trump phenomenon as a case study that supports their larger theme. Houghton Mifflin Harcourt, 2020, 450 pp., $16.99.



PRO TRUTH: A Practical Plan for Putting Truth Back into Politics. Gleb Tsipursky and Tim Ward. Democracy works only if citizens value truth. This book is an analysis of post-truth politicians from the vantage of behavioral science research and communications strategies, and it provides some answers. Topics include why we should care about truth in politics, the behavioral science of political deception, the illusory truth effect, the decline of mainstream media and rise of social and online media, rational communication, collaborative truth-seeking, the pro-truth pledge, and building a pro-truth movement. The United States and some other countries are at a precipice, the authors say. As trust erodes, will we slide down the slippery slope where we believe only what our own side says and reject all other information? "Or can we take a step back, onto the firmament of truth?" John Hunt Publishing/Changemakers Books, 2020, 270 pp., $19.95.

QUACKONOMICS: The Cost of Unscientific Healthcare in the U.S. … and Other Fraud Found along the Way. Ethan L. Welch, MD. Welch, emeritus professor of surgery at University of Rochester School of Medicine, examines quackery practiced under the cover of complementary and alternative medicine (CAM). He first summarizes the historical origins of scientific thought, traces the origins of antiscience in the United States, defines the placebo effect, and then documents the absence of science in twenty-five examples of CAM, from acupuncture to homeopathy, from herbal medicine to aromatherapy, from spiritual healing to iridology. Researching the cost of unscientific healthcare, he finds it is over $40 billion, but when you consider fraud embedded in our medical systems, he estimates the damage at $100 billion. Page Publishing, 2020, 444 pp., $24.95.



UNDERSTANDING EVOLUTION. Kostas Kampourakis. Why are we still having to debate evolution? Kampourakis (University of Geneva), editor of the Cambridge University Press series *Understanding Life*, says it is not just due to the resistance of religion; evolution is in fact a counterintuitive idea that is difficult to understand. This book is an attempt to bridge that gap of understanding. This is a new edition of a 2014 book that was originally a textbook but now has been rewritten for a general audience. Its driving force is to identify and unpick the conceptual obstacles to understanding. He discusses evolution in the public sphere, evolution and religion, the conceptual obstacles to understanding evolution, the development of Darwin's theory, evolutionary processes, and evolution and the nature of science. In concluding remarks, the author thoughtfully and personally addresses the implications of evolutionary theory for human life. Cambridge University Press, 2020, 193 pp., $14.95.

Downfall of a Charlatan

I was disappointed with David Marks's long and interesting article on the downfall of Hans Eysenck (November/December 2020) for two reasons.

First, he criticizes Eysenck for his "credulous defense of parapsychology." But parapsychology is a legitimate field of science, even if the phenomena it seeks may never be found. It is only the positive claims of psi that Eysenck should not have defended.

Second, and more personal, is Marks's description of my work with Carl Sargent. The ganzfeld methods Sargent used are complex, and my discoveries and their implications are hard to understand. Yet Marks does not cite my original article or my book recounting the whole story (Blackmore 1987a; Blackmore 1996). Without these, it is impossible for readers to understand what happened and draw their own conclusions from the evidence. He does, however, cite Sargent's and Harley's rebuttals of my article but not my reply to them (Blackmore 1987b).

Marks includes answers to questions he emailed to me. But he did not ask me about the Parapsychological Association's investigation. He writes that they reprimanded Sargent but not that they also reprimanded me very heavily, which was traumatic for me on top of the pain of discovering that my esteemed colleague and friend was probably cheating. They deemed it indefensible of me to go into Sargent's office, open his randomization envelopes, and set traps—all of which I knew was necessary for me to try to get to the truth, and Sargent had explicitly given me the run of his office.

We did not know then that this is the common fate of whistleblowers, though we do now. When Sargent died two years ago and I responded to Harley's obituary (Blackmore 2020), I thought I would never have to return to this miserable topic. Sadly, it goes on.

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———. 2020. A response to the obituary for Carl Sargent. *Journal of the Society for Psychical Research* 84: 3, 182–183

Susan Blackmore
Ermington, Devon, U.K.

David Marks replies:

My SI article "Downfall of a Charlatan" focused on Hans Eysenck and Carl Sargent cheating with data and promoting false claims in parapsychology. Sadly, as the whistleblower, Susan Blackmore in her letter reveals she suffered "the pain of discovering that my esteemed colleague and friend [Sargent] was probably cheating" and that she was traumatized by the Parapsychological Association's admonishment for the manner of that exposure. In turn, Susan Blackmore admonishes me for not citing her extensive publications on this topic, which are listed in her letter. Clearly, there can be no saints in this unsavory episode, only sinners. Please let's agree that this chapter in the checkered history of parapsychology and "skepticism" can finally be closed.

Quantum Voodooism

Regarding Sadri Hassani's "Sources of Quantum Voodooism" (November/December 2020), it is the "unique character of quantum physics"—as opposed to, say, condensed matter physics or even relativity—that makes it such an attractive apparent foundation of holistic or New Age worldviews. Central ideas such as "mind over matter" and the interconnectedness of everything in the universe seem to be backed by quantum theory: 1) The need to include the measurement apparatus in a rigorous discussion of particles' behavior is (wrongly) extrapolated to imply the necessity of a conscious observer; and 2) Nonlocal correlations between entangled particles are (wrongly) thought to prove the existence of universal connections between apparently separate entities.

Spiritualism wants to be a "warm" alternative to the "cold," purely materialistic world devoid of meaning associated with Newtonian physics and its clockwork universe. If physics is to provide corroborative evidence for spiritualism, it is thus natural to look for it in the quantum realm, which is not seen as an expansion but as a refutation of classical physics.

Unfortunately, the abuse of quantum mechanics by purveyors of esoteric nonsense is thus not likely to go out of fashion. It is just too good of a victim. And yet, quantum theory itself provides powerful counterarguments. If everything is connected to everything else due to entanglement, then why do entangled particles need to be so thoroughly insulated against the outside world in actual experiments?

Dr. Philippe Leick
Gerlingen, Germany

God's Pet Bunny

Stanley Rice's use of Haldane's "God's bunny" as a rhetorical vehicle for critiquing creationism was informative and fun ("Creationist Funhouse, Episode 5: God's Pet Bunny," November/December 2020). Rice points out that the entire creationist framework is simply incoherent when matched against the fossil and geological record. He is, of course, spot-on.

But there's another, rarely noted element to creationist thinking that he doesn't touch on. Put simply, when creationists use the "flood" hypothesis to explain the data they are acknowledging that the god of their belief system is the greatest mass murderer of all time. I pointed this out to a creationist I met at a party one evening. He, of course, had never considered this and countered with the claim that all those who drowned were Sodomites, pagans, atheists, or other miscreants who hadn't accepted the one true god. I asked him why, if this were true, his god also needed to rid the world of newborn babies, pregnant mothers, devout priests, rabbis, and acolytes, all of whom perished. He did not look happy and walked away. I've often wondered if this revelation made any impact on his belief system.

Arthur S. Reber, PhD
Point Roberts, Washington

In "God's Pet Bunny," Stanley Rice refers to the Cambrian period and writes, "Geologists have given names to each of the periods of earth history. Some, like Cambrian, were named after places where they were first found (in this case, Cambridge)."

The period is named after Cambria (the Latin name for Wales) and specifically the Cambrian mountains in Wales (between Snowdonia and the Brecon Beacons), not the markedly unmountainous fenlands of Cambridge.

John Ritson
London, United Kingdom

I am enjoying your series "Cre-

ationist Funhouse" in Skeptical Inquirer. In Episode Five ("God's Pet Bunny"), there is an error. On p. 55, there is a list of marsupial counterparts, including marsupial bats. However, bats are placentals, not marsupials.

Ray C. Telfair II, PhD
Certified Wildlife Biologist
Whitehouse, Texas

Stanley Rice replies:

I was referring, apparently a little too carelessly, to the sugar glider, Petaurus breviceps*, which more closely resembles a flying squirrel than a bat.*

History of Lynchings

I loved Guy P. Harrison's commentary on lynching ("Why White America Must Learn the History of Lynching"), but I guess he ran out of space to include some important additions.

Though lynching was prominent in the South, the South wasn't the only region it was done; the Northeast was the only region that didn't record a lynching.

Each time there was a lynching, the NAACP office in Washington, D.C., would hang a banner from their window that said "A MAN WAS LYNCHED TODAY" so that Legislators driving to their offices at the Capitol could see it.

Two hundred anti-lynching bills were introduced in Congress; three made it past the House to the Senate only to be stalled by the Southern Democrats. These laws would have made lynching a federal crime, as the states (citing states rights) were doing nothing about it. The Civil Rights Acts of the 1960s made the need for such legislation moot.

White people constantly accuse black people of living in the past. ("This happened years ago, so get over it! Things have changed!") Well, those same Southern Democrats were absorbed into the Republican Party in 1968 as part of the Southern Strategy for their seniority; in trade, the Republicans will never (and still haven't) adopt a civil rights platform.

In 2005, the Senate adopted a Non-Binding Resolution to "apologize" for failing to pass an anti-lynching bill. This resolution neither offered compensation nor changed any law. It was simply a resolution. By the recess, the press reported that all the Democrats had voted for it, but most of the Republicans hadn't. Then–Senate Majority Leader Bill Frist, sensing a public relations disaster, rounded up Republicans to vote, but Republicans (many from the Deep South) didn't vote No—they just declined to vote at all. No official roll call was taken, and the press was left guessing who didn't sign on. But note this is decades after society was supposed to change.

Erik Bailey
Vallejo, California

Thank you for publishing Guy Harrison's excellent commentary, "Why White America Must Learn the History of Lynching." It was well researched and reasoned and couldn't have been more timely or important. The articles published in Skeptical Inquirer are of the highest quality, and Harrison's commentary was no exception. Thank you.

Timothy J. Redmond
Amherst, New York

In September 1914, W.E.B. DuBois—one of the founders of the NAACP—penned a powerful and eloquent editorial on lynching for *Crisis*, the monthly publication of that organization for which he served as editor for twenty-four years. It should be required reading for all Americans.

It is too long for you to publish, but I hope readers will look it up and read it in full. Here is one brief excerpt:

> Once more a howling mob of the best citizens in a foremost state of the union has vindicated the self-evident superiority of the white race. The case was perfectly clear: it was not that murder had been done, for we Americans are not squeamish at mere murder. Off and on, we do more of that kind of thing than most folk. Moreover, there was not much of a murder—only the crazed act of a drunken man, quite unpremeditated. The point is, he was black.
>
> Blackness must be punished. Blackness is the crime of crimes as the senator-elect from Mississippi has amply proven. Why is it a crime? Because it threatens white supremacy.

David Gardner
Lacey, Washington

Lynching is a terrible blight on American history and should be taught. Unfortunately, Guy Harrison's commentary is misleading. George Floyd's death is regrettable, but he was a career criminal, high on drugs, who resisted arrest. Floyd's attacker was arrested and will stand trial. Floyd was not lynched as defined by the Tuskegee Institute.

More questionable is Harrison asserting 4,000 lynchings from post–Civil War through 1950 averaged "one black person lynched per week spread over nearly nine decades." That's a preposterous perversion of average. What do the data actually show? The last year averaging one lynching per week was 1922—ninety-nine years ago. Subsequently, lynchings markedly declined. Give credit to the brave blacks and whites beginning in the 1930s who roused a complacent public to demand reforms. The struggle against racism continues, but today hate crimes are aggressively prosecuted. Black voting and holding elective office have steadily risen. Harrison loses credibility ignoring progress by implying ninety years of stasis when the data refutes him.

John Clinger
Bella Vista, Arkansas

I suspect Guy Harrison is right, and Americans do need to learn the history of lynching. Perhaps they also need to learn the history of anti-Semitism in the United States, along with the negative stereotyping of Italian-Americans as low-life mobsters and the historical mistreatment of Native Americans. However, I see no reason why Harrison's harangue should be presented on the pages

of Skeptical Inquirer, a publication with a specific focus on paranormal claims and attacks on science and rationalism. I do not subscribe to this magazine to be hectored on social grievances and the need for white guilt.

Dennis Middlebrooks
Brooklyn, New York

Guy Harrison replies:

All my data was drawn from Lynching in America, an ongoing project by the Equal Justice Initiative. It's not protest-oriented material but sound historical scholarship produced by respected historians at credible universities. (See Lynching in America: Confronting the Legacy of Racial Terror at eji.org.) The stats they use are sound, probably a huge underestimate in many cases given the cover-ups.

It's understandable and expected that this topic would upset people. If talking/writing in an honest manner about lynching thousands of black people didn't make us uncomfortable, something would be very wrong. Again, my commentary did not make claims that police kill more blacks than whites today or that every victim was a perfect citizen. It's about the missing historical awareness in our society that leads to confusion and insensitivity. Skeptical Inquirer, from my perspective as a reader for many decades, is not only committed to busting UFO cases and explaining astrology but also uplifting and educating humanity so that we may be safer and more efficient in our daily lives. I think this essay fits given the times, and I applaud the magazine for having the courage to run it.

Feng Shui

In his review of the book *Feng Shui: Teaching about Science and Pseudoscience* (November/December 2020), Terence Hines laments the lack of formal testing of feng shui. However, years ago, on their television series *Bullshit!*, Penn & Teller did test feng shui in a very elegant and logical way. They hired three feng shui "experts" and had each in turn furnish the same large house. Needless to say, each master came up with completely different arrangements of furniture and decorations—this after assuring the magicians that they were guided strictly by well-established scientific principles honed over centuries, with no mysticism or personal taste involved. Even with this limited sample, I believe the case was closed.

N.C. Jones
Winchester, Virginia

UFOs Again

In the news and comment article "UFOs Come Out of the Shadows. Again. Perhaps" (November/December 2020), author Mick West asks rhetorically, "Why would [defense contractor] Eric Davis know something [about government UFO research] that Senate Majority Leader Harry Reid would not … ?"

Well, for one thing, Mr. Reid hasn't been Majority Leader since 2015 and hasn't even been a Senator since 2017, while Mr. Davis's purported briefing occurred in March 2020. For another thing, while the Senate Majority Leader would certainly be privy to a lot of classified information, there are *thousands* of classified programs and Special Access Projects. No one person could possibly be aware of all of them.

More to the point, it seems to me, is that Mr. Davis is claiming that *he* gave a briefing on UFOs *to* the Defense Department (DoD). Mr. Davis is the source of the purported information. The fact that he gave a classified briefing to DoD officials at best shows that they were interested in what *Mr. Davis* thought *he* knew about UFOs—not that the DoD officials themselves had any information.

W. David Pattison
Leland, North Carolina

Another Side of Randi

Some of the public, no doubt, saw James Randi, who died October 20, 2020 (see "Remembering Randi," January/February 2021), as a somewhat gruff, insensitive, rather close-minded paranormal skeptic. It's true that he had little tolerance for charlatans. If Randi had evidence someone was lying or was a fake, he had little reservation about exposing them. No criticism here. But some of the public might be surprised to know of Randi's more sensitive side. As an example, Randi had a soft spot for impoverished children. I wish everyone could have heard him speak on this topic. It was another side of Randi.

The public might also be surprised to hear of Randi's entertaining sense of humor. Example: Randi once came to Oklahoma City to speak and we had dinner one night at a Chinese restaurant. When we were finished, we opened our fortune cookies. His read, "You are the guiding star of his existence." Not a person of faith, Randi gave me the fortune, closed his eyes, put his hands together like he was praying, and said something like, "Dear Lord, I hope this fortune was meant for Bryan." Watching James Randi pray was utterly hysterical and is something not many have seen him do—even in fun. I still have the fortune taped to my refrigerator. It was another side of Randi. These are just a few examples.

Thanks, James Randi, for helping teach critical thinking to so many. Thanks for alerting the public about scams, flimflam, and con artists. And thanks for teaching me how to better handle the media. Just thanks.

Bryan Farha
Author, *Pseudoscience and Deception*
Professor of Behavioral Studies in Education
Oklahoma City University

[FEEDBACK

The letters column is a forum on matters raised in previous issues. **Letters should be no longer than 225 words.** Due to the volume of letters we receive, not all can be published. Send letters as email text (not attachments) to letters@skepticalinquirer.org. In the subject line, provide your surname and informative identification, e.g.: "Smith Letter on Jones evolution article." Include your name and address at the end of the letter. You may also mail your letter to the editor to 944 Deer Dr. NE, Albuquerque, NM 87122.

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Churning Texture in Jupiter's Atmosphere

On January 13, 2021, NASA announced that its *Juno* spacecraft, in orbit around Jupiter since July 2016, will become an explorer of the full Jovian system—its planets and rings. NASA authorized a mission extension for *Juno* through September 2025, or until death of the spacecraft. This will allow *Juno* to make multiple rendezvous with three of Jupiter's most intriguing Galilean moons: Ganymede, Europa, and Io.

Juno captured these elaborate atmospheric jets in Jupiter's northern mid-latitude region. This detailed, color-enhanced image reveals a complex topography in Jupiter's cloud tops, including relatively small, bright, "pop-up" clouds rising above the surrounding features. Citizen scientist Kevin M. Gill processed this JunoCam image, taken on April 10, 2020, as the Juno spacecraft performed its twenty-sixth close flyby of the planet.

IMAGE DATA: NASA/JPL-CALTECH/SWRI/MSSS IMAGE PROCESSING BY KEVIN M. GILL © CC BY